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> Osler AG. *Complement: mechanisms and functions*. Englewood Cliffs: Prentice Hall; 1976.

1 The Vancouver style. *J roy nav med Serv* 1979; **65**: 179.
2 International Committee of Medical Journal Editors. Uniform requirements for manuscripts submitted to biomedical journals. *Br Med J* 1982; **284**: 1766–70.

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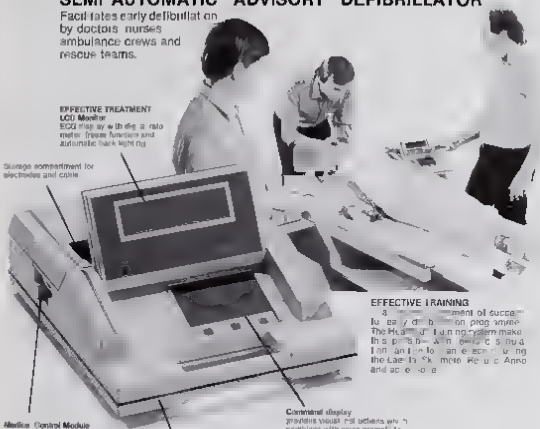
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HMS Rover in rough seas the photograph taken by Surgeon Lieutenant Mark Parrish which was awarded second prize in the First Royal Naval Amateur Photographic Competition

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Foreword:

The Journal of the Royal Naval Medical Service Seventy Five Years On

The intention to found a Journal for the Royal Naval Medical Service took shape in 1914 but the outbreak of the First World War delayed the start and the first issue did not appear until January 1915, some four months before the Gallipoli landings. It was the Editors' belief that some of the scientific and medical material in medical officers' official reports and other papers was unavoidably wasted in former times and much of this deserved wider publication. It is interesting to note that the first number contained an article on naval aviation expressing concern about high velocity accidents in many machines up to seventy mile an hour. Useful descriptions of casualties admitted to the Royal Naval Hospitals at Shotley, Chatham and Plymouth provide an insight into naval battle casualty management of the time and an article describes a naval ambulance train of particular interest to those involved in planning casualty evacuation in central Europe today.

The early post war years were preoccupied with considering the lessons learned but by the nineteen twenties the problems of infectious diseases particularly tuberculosis were regularly discussed. Typhoid, syphilis, typhus and cholera were common concerns while conditions with which we are very much more familiar such as duodenal ulcer did not merit consideration.

Some notable milestones were recorded over the years. In 1938 Derek Steele Perkins (Medical Director General 1963–66) described the use of Prontosil for gonorrhoea. In 1940 the first references to blood transfusion were made and in 1941 the year that the National Blood Transfusion Service began, some 15 000 sailors donated blood. In 1947 Dick Caldwell (Medical Director General 1966–69) described the use of Streptomycin in the treatment of tuberculosis. In the late fifties and early sixties T. L. Peter Cleave was publishing his far-seeing views on dietary fibre and refined carbohydrate and their relation to disease. In the late sixties James Watt (Medical Director General 1972–77) drew attention to the high incidence of duodenal ulceration in sailors and discussed the surgical management.

The years of the Second World War were dominated by papers on surgical management of battle casualties and on the management of those infectious diseases including malaria encountered by large groups of men serving in close proximity in ships. Backache and pilonidal sinus were common causes of loss of naval manpower. It is interesting that after the war very little mention was made of other minor conflicts. There are no references to the Suez operation, and none to the Indonesian confrontation when many naval medical officers saw active service. It was not until the South Atlantic Campaign in 1982 that the medical support to a major amphibious and land operation was discussed in detail and these papers, in retrospect, will provide a fascinating historical commentary.



Surgeon General Sir Arthur May KCB KHP. Medical Director General of the Navy
11 May 1913 to 31 May 1917



Surgeon Vice Admiral Sir Godfrey Mitton Thompson KBE QHP Medical Director General (Naval)
1 November 1984 to date

However interesting changes were apparent in the subject matter The use of helicopters as ambulances was described in 1956 Ionising radiation made its appearance in the fifties and more recently the medical problems of the submarine service and of diving have been often discussed

In the last twenty years the Journal has increasingly become a forum for the publication of original research as well as continuing to address problems of naval medicine in the operational scene Clinical matters are still regularly reported and debated but there remains a strong tradition of preventative medicine Medical and dental officers still travel to unlikely and inhospitable places recording their observations which will continue to be scientifically and historically important The Journal still provides a permanent record of entries promotions, appointments honours, retirements and obituaries Seventy five years on the Journal continues to confirm its first Editors prescience Long may it continue to do so

Godfrey Milton Thompson

1990
75th ANNIVERSARY

The first publication of the Journal of the Royal Naval Medical Service was in January 1915 Volume 1 comprising the four issues of that year The Editorial Committee are to mark this milestone by offering a commemorative prize

THE JOURNAL OF THE ROYAL NAVAL MEDICAL SERVICE 75th ANNIVERSARY PRIZE

75 Guineas to be awarded to the author of the best paper submitted by a member of the Royal Naval Medical Services during 1990 who remains under training or not graded consultant or of equivalent status

The entries will be assessed by the Editorial Committee whose decision will be final

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Sickle Cell Trait and Military Service

C M James

INTRODUCTION

This review of the current literature will examine the relevance of sickle cell trait to recruiting and to the practice of military medicine

SICKLE CELL TRAIT

Sickle Haemoglobin (HbS) is a variant of haemoglobin formed by the substitution of Valine for Glutamic acid at position 6 of the beta chain This disrupts the quaternary structure of the haemoglobin molecule so as to cause crystallisation when the red cell is stressed by hypoxia acidosis high osmotic pressure or a combination of these factors This crystallisation which is initially reversible, causes the characteristic sickling of the red cells

Sickle haemoglobin may be inherited in a homozygous form (HbSS) causing sickle cell disease a severe chronic anaemia characterised by continuous intravascular sickling which is incompatible with military service Inheritance as a heterozygote with haemoglobin A (HbAS) causes sickle cell trait (SCT) It may also be inherited as a compound heterozygote with other haemoglobin variants such as Haemoglobin C and Beta Thalassaemia

Sickle Haemoglobin is found in Equatorial Africa Southern India Southern Turkey Saudi Arabia Sicily Cyprus and Greece It is also found in areas to which these people have emigrated, notably the West Indies the United States and Great Britain The geographical incidence of sickle cell trait in the UK varies widely and is becoming increasingly common in conurbations where recruiting offices are located

The incidence of sickle cell trait in the UK has been reported as 3 3% of blacks[1] In the USA the incidence has been reported in a number of studies and amounts to about 8% of blacks and 0 08% of non blacks[2] In contrast to the UK Armed Forces where no formal study has been carried out there have been a number of surveys of American Armed Forces Recruits including a population of 8752 black enlistees of whom 6 8% had sickle cell trait[3] and another study of 1000 black enlistees in whom the incidence was 7 3%[4]

At present the number of servicemen in the UK Armed Forces with sickle cell trait is low but will increase as efforts are made to recruit from the ethnic minorities.

ARE THOSE WITH SICKLE CELL TRAIT FIT TO SERVE IN THE ARMED FORCES?

To be fit to serve in the Armed Forces a certain standard of physical fitness must be assured Initial medical examination should exclude any individual with a predictably increased chance of morbidity or death during training and service or who is constitutionally unable to cope with the demands put upon them

Epidemiological surveys have revealed no reduction in the incidence of sickle cell trait with increasing age suggesting that there is no excess mortality associated with the condition A study[5] of 120 autopsies in those with sickle cell trait compared with 1104 normals showed no difference in the mean age of death between the two groups However visceral infarcts were found in 15% of those with sickle cell trait compared to only 1% of controls The finding of sickled cells in tissues post mortem reflects only

Surgeon Lieutenant Commander James is a Senior Specialist in Pathology and is appointed to Royal Naval Hospital Haslar

the extreme hypoxia and acidosis involved in the process of death rather than implying a causal relationship This is an important factor which must be understood when interpreting reports of death due to sickle cell trait[6]

There have been reports of sudden unexplained death during physical training in those with sickle cell trait[7] and a large survey involving 2 million American Armed Forces recruits has addressed this observation[8] All cases of unexplained sudden death occurring during initial training were exhaustively studied and the risk estimated for those with sickle cell trait and those without Their conclusions were that

a The risk of exertion-induced sudden unexplained death on black recruits with sickle cell trait was 28 times higher than in blacks without sickle cell trait and 40 times higher than in all other recruits

b The incidence of sudden unexplained death amongst black recruits with sickle cell trait rose from 12 per 100 000 in the group of 17–18 years old to 136 per 100 000 in the 26–30 years old group These latter figures are based on small numbers

c The risk of explained and unexplained death in non sickle cell trait blacks was twice that of whites This figure is in line with US national mortality studies[9]

It seems from the available evidence that having sickle cell trait and taking part in strenuous physical exercise is associated with a small increase in the incidence of sudden death This may amount to a risk of 31 per 100 000 individuals with sickle trait in the UK Armed Forces this is unlikely to give rise to more than one recruit death per decade

The morbidity associated with sickle cell trait has been extensively reviewed[9,10] and the consensus is that the following conditions are increased in sickle cell trait

Bacteriuria
Hyposthenuria
Haematuria
Bacteriuria and Pyelonephritis in Pregnancy
Splenic Infarction with Hypoxia equivalent to altitudes in excess of 10 000 feet.

Haematuria may occur in 4% of those with sickle cell trait in a lifetime. It may be severe and require nephrectomy it is probably due to sickling in the vessels around the corticomedullary junction where the cell is exposed to the highest osmotic pressure

Hyposthenuria is a failure of urine concentrating ability also due to renal damage from repeated minor infarcts This is generally unimportant although may predispose to dehydration in extreme conditions

In conclusion although there are slight risks of increased mortality and morbidity for those with sickle cell trait there is no clear contraindication for their recruitment into the Armed Forces However in some occupations those with sickle cell trait are or may be exposed to severe stress and the evidence that some branches should be closed to those with sickle cell trait will be examined

SHOULD CERTAIN BRANCHES BE BARRED TO THOSE WITH SICKLE CELL TRAIT?

Aviation

Flying, even in pressurised aircraft exposes an individual with sickle cell disease to hypoxia dehydration and immobility which may result in intra-vascular sickling and a painful crisis By contrast there have been no reports of sickle crises in those with sickle cell trait flying in commercial aircraft where the cabin pressure is maintained at 7 500 feet There are however many reports of a clinical picture termed Splenic Syndrome in those with sickle cell trait exposed to hypoxic equivalent to an altitude in excess of 10 000 feet There have been other reports[11] of Splenic Syndrome occurring in subjects flying in pressurised aircraft to locations such as Colorado which are at high altitudes This series of six patients were all phenotypically non black and half had experienced symptoms at altitudes of between 5 280 and 7,000 feet

The Splenic Syndrome describes left upper quadrant pain typically starting between thirty minutes and two hours after exposure to hypoxia There is tender splenomegaly mild pyrexia, tachycardia and often a pleural rub Paralytic ileus and sympathetic left pleural effusions occur The treatment is symptomatic and splenectomy is rarely required Splenic histology in these cases reveals infarcts and necrosis throughout the spleen but massive splenic necrosis is very rare

There have been a number of studies aimed at demonstrating sickled cells in the peripheral circulation of those with sickle cell trait exposed to hypoxia in decompression chambers or unpressurised aircraft Many of these studies were poorly constructed and demonstrated poor technique however a study of anti coagu-

lated blood samples from those with electrophoretically proven sickle cell trait exposed to various altitudes showed sickling after six minutes at an equivalent altitude of 10 000 feet[11]. Another study[12] of five subjects with sickle cell trait given radio-labelled red cells showed localisation of radioactivity over the spleen following exposure to simulated altitudes of 7–8 000 feet implying increased splenic trapping of sickled cells.

It seems probable that a proportion of those with sickle cell trait will develop a Splenic Syndrome if exposed to hypoxia equivalent to an altitude of 10 000 feet or more. On the basis of available evidence there is no clear risk to those with sickle cell trait flying in pressurised aircraft or in aircraft that do not exceed 10 000 feet. Pilots or co-pilots should remain barred as recommended by the National Academy of Sciences–National Research Council in 1973[14].

Diving

In contrast to the position with aviation there have been very few studies to determine the risks of diving to those with sickle cell trait. Those exposed to real or simulated depths in excess of thirty metres or to special breathing mixtures such as Mine Clearance Divers must be physiologically fit and those with sickle cell trait should be excluded. Ships or recreational divers descending to 30 metres are not so stressed and there is no clear case for the exclusion of those with sickle cell trait. American sub-aqua organisations do not consider sickle cell trait a bar to recreational diving however the British Amateur diving organisations recommend that those with sickle cell trait should be made medically unfit to dive (Personal Communication).

Submarine Branch

Submariners are not normally exposed to any worse physiological stresses than other servicemen however during their submarine escape training and in the event of emergency submarine escape they may well be exposed to stresses that would precipitate sickling. The small but real incidence of decompression sickness following ascents indicates the potential hazards for those with sickle cell trait. As a consequence those with sickle cell trait are barred from entry.

Royal Marines and Special Forces

There is no evidence that those with sickle cell trait are less able to withstand strenuous exercise or unable to compete at the highest level of athletics. Indeed a study[15] of professional American Footballers showed the same incidence of players with sickle cell trait as in the general population. There appears to be no increased morbidity due to cold exposure as demonstrated in a small study in 1952 of American servicemen training in Arctic conditions.

The persistence of sickle cell trait is thought to have been due to the selective advantage of sickle haemoglobin with regard to resistance to Falciparum malaria in endemic areas. This remains a theoretical advantage to those with the trait and also implies that those affected have no major problems in coping with hot climates.

There are case reports of Rhabdomyolysis associated with exercise and heat stress in those with sickle cell trait[16] and in the light of the report of Kark *et al*[6] recommendations have been made by the US Army Medical Corps with regard to physical training in extreme conditions. These enforce gradual acclimatisation, gradual conditioning for each type of activity, maintenance of hydration and adjustment of activities according to the climatic conditions at the training site. On the basis of these concerns and the principle of exclusion of any potential physical disadvantage those with sickle cell trait are barred from entry to the Royal Marines.

OTHER FACTORS

Anaesthesia

It is a generally accepted routine that any patient in the appropriate racial group should have their sickle cell trait status checked preoperatively. Although this is a sensible precaution and of medico-legal importance a review[17] of five series of reports on anaesthesia in a total of 556 patients with sickle cell trait undergoing general anaesthesia has shown no attributable mortality and the author concluded that there was no increased anaesthetic risk. This view has been challenged[18] and the authors stress the avoidance of dehydration and hypoxia. Awareness of a patient's sickle cell status allows special care to be taken especially in the less than ideal conditions of war surgery when those with sickle cell trait may be exposed to a minor but probably unimportant risk of sickling.

Tourniquets

The use of tourniquets to produce a bloodless field for limb surgery may cause local tissue

hypoxia and consequent sickling which may compromise the microcirculation. One report[19] suggests that tourniquets are relatively contraindicated in those with sickle cell trait.

Blood Donation

Possession of sickle cell trait is not considered a bar to blood donation as long as the donor is not anaemic. A study of 19 000 blacks in New York showed no decrease in haematocrit in the sickle cell trait population except amongst children. Blood stored for 28 days in acid citrate phosphate-dextrose showed less than 1% sickling and no change in haematological parameters[20]. Sickle trait blood is not suitable for freezing.

Trauma

Severe trauma, particularly if accompanied by dehydration and/or hypoxia, may cause sickling. Those with sickle cell trait should receive special consideration of those problems.

SUMMARY

In the community great efforts have been made to educate those with sickle cell trait that their condition is not a handicap and that they are fit to lead a normal life. It would be seen as a retrograde step for the Armed Forces to imply that they are in some way unfit for normal duties.

The evidence presented demonstrates that with the exception of a small excess risk of sudden unexplained death during training there is no objection to recruiting those with sickle cell trait into the Royal Navy.

At present those with sickle cell disorders are barred from service in the Royal Marine Commandos and from diving, submarine and aircrew service.[21] On the basis of the evidence presented in this review a case can be made for allowing those with sickle cell trait to enter as aircrew in helicopters but not as pilots. In view of the requirements for military divers to operate in cold water under stressful conditions the exclusion of those with sickle cell trait is entirely justified. The overriding requirement must be the safety of both the affected individual and of others and the current regulations reflect this.

Screening of all recruits and officer entrants in appropriate racial groups is not performed at present but would allow counselling and advice to be given to those affected by sickle cell trait at an early stage of their careers and the reasons for their exclusion from certain branches fully explained either by establishment Medical Officers or by the haematologist. It is of interest that in the United States legal action has been taken by some affected recruits against the Armed Forces for disbarring them from Aircrew training on the basis of their Sickle cell trait. They argue that the scientific evidence is not sufficiently strong to justify such discrimination.

Recording the sickle cell status on the F Med 4 would alert medical attendants to their special problems and those responsible for training should take note of the need for properly graded training for all servicemen and particularly for the increasing number who are affected by this usually benign condition.

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Papers published by Royal Naval Medical Officers

Case Report Perforation of the colon after barium meal examination A J Walker *Clin Radiol* 1989 **40** 540
Small bowel volvulus secondary to enteroscopy for jejunal stricture A J Walker *J Pediatr Surg* 1989 **24**(11) 1152
Varicose veins: optimum compression after surgery and sclerotherapy P J Shouler and P C Ramchurn Ann *R Coll Surg Engl* 1986 **71** 402–404

Publications by Medical Officers

A Colour Atlas of Resin Bond Retained Prostheses. A Practical Guide R T Walker A Darmer P R H Newsome and S K Ngai Published by Excerpta Medica Asia Ltd Hong Kong. £15.00
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Dr R T Walker PhD MSc BDs FDS
Head of Department of Conservative Dentistry
Prince Philip Dental Hospital
34 Hospital Road
Hong Kong



Veterans of two World Wars, with members of the Royal Naval Medical Ratings and Sick Berth Staff Association watch Ted Bishop (31) (*left*) lay a wreath at the rededication of the memorial to the RN Sick Berth Staff held at Royal Naval Hospital Haslar on Sunday 3 September 1989
(*Photograph reproduced by kind permission of the Portsmouth News*)

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Chirurgeon: Look to the Wounded

R S Allison

Many aspects of naval history are of interest to medicine—among them are the great sea battles which were fought by our seamen in the past It is true however as James Lind remarked that the number of men killed in battle was always less than the number of those who died from disease Nevertheless the naval actions which were fought in the past were usually desperate affairs in which the proportion of killed and wounded despite the comparatively primitive armament used, was very similar to present day warfare

WARSHIP EVOLUTION

The old wooden walls of England differed only in non-essentials from earlier types of warship They were bigger they carried more men and guns but from the 16th century to the middle of the 19th century they remained essentially the same in design Propelled by sails the aggressive power depended entirely upon muzzle loading guns which were trained outboard through ports in the ship s side and arranged in tiers upon gun decks named appropriately upper and lower with a middle gun deck in the biggest vessels

It is probable that only three important changes occurred in the development of wooden warship construction and that these were brought about firstly by the influence of slavery secondly by the introduction of gun powder and thirdly by the evolution of steam power The ease with which human labour could be obtained and the then practice of employing slaves in civilised communities determined the construction of the oar-propelled war galleys of the Greeks and Romans and later of Venice and Genoa It was the introduction of heavy ordnance or cannon that made the galley obsolete Guns in the latter could only be mounted at the bow or stern whereas the evolution of sail radically altered ship construction in favour of the types evolved in the 19th century

Reflections upon armament

During the whole reign of the wooden sailing battleship fighting was carried out by close range bombardment ship matching ship and solid cannon balls or grape shot being the principal missiles used Canister shot was made up of old pieces of scrap iron broken gun locks nails and the like put into a container or canister which was then rammed down the muzzle of the gun and fired in the usual way by a charge of gunpowder Other missiles were langrage (a type of case shot loaded with pieces of irregular shaped iron) star shot and musket balls and at close quarters after boarding, the assailants fought with cutlasses boarding pikes and pistols

By modern standards no really accurate gunnery was possible but the range was short and through practice remarkable degrees of efficiency were achieved For example it is recorded on one ship a frigate that at gun practice each gun was allowed three shots The mark was a beef cask with a 4ft square of canvas on top of it At a range of 300–400 yards the canvas was cut to pieces

THE CHIRURGEON

Location of surgical facility

In addition to the upper and lower gun decks,

This article is based on a paper found among the late Surgeon Captain Allison's effects and is published at the request of his son John W M Allison a keen student of Naval history

there was the orlop which lay between the hold and the lower gun deck It had no gun ports being below the water line and in the after part amidships, the cockpit was placed This was the principal dressing station for the treatment of the wounded in action The site was good because it was comparatively immune from direct hits and not only could the surgeon work uninterrupted but he was more secure than if he had been on the gun decks above Popular opinion was against the surgeons exposing themselves to danger unnecessarily not because their lives were especially valued but because few seamen would enter a fight unless they could be assured that there was a capable surgeon to attend to them if they were wounded Thus it is recorded in 1627 that the seamen would do nothing without a chirurgeon and in 1628 the crew of HMS *Rainbow* actually deserted from the ship because it had become known that the medicine chest was empty

Training the surgeon s auxiliaries

The wounded were brought down to the cockpit by their individual messmates and the only assistants at operations were the chaplain the purser and a few seamen who had been excused their duties. Being fully occupied with his casualties the surgeon could only determine the progress of a battle from the noise of gunfire surrounding him and from the reports of the wounded On at least one occasion this uncertainty led to a humourous incident. During the voyage of the Bristol privateers *Duke* and *Duchess* it was decided to hold a sham fight between the ships to train the crews at their action stations Battle conditions were reproduced so faithfully that the surgeons in the cockpit thought they were dealing with real casualties and were nearly betrayed into amputating sound limbs!

> During this sham engagement everyone acted the same part he ought to have done if in earnest firing with ball excepted Our prisoners were secured in the Hold by the surgeons, who had their instruments in order and to imitate business for them I have order d red lead mixt with water to be thrown upon two of our fellows and sent 'em down to the surgeons who were very much surprised thinking they had really been wounded and the surgeons actually went about to dress them but finding their Mistake it was a very agreeable diversion "

Reality of active service

In actual battle the scene in the cockpit must have been hard to equal in its grim realization In the flickering light of a few lanterns because otherwise the orlop was in perpetual darkness the surgeon performed amputations and sewed up gaping wounds Neither sterilization of his instruments nor any form of anaesthesia was available and only the noise of the cannonading drowned the cries of pain arising from all around him Amputations were performed swiftly by means of a circular incision, the bone being sawn through and the bleeding vessels grasped by forceps and ligature John Woodall referring to wounds in which cut arteries or veins were exposed, advised that the ends should be first cut and holden with some fit instrument and tied with a sure and strong silk thread 'bni oft it happenth that the ends of the veins or arteries wounded cannot be found in which case an actuall caustick remedy or a potential caustick medicament which induceth an casker and stoppeth and covereth the orifice of the veins is convenient

SURGICAL PRACTICE

The case for and against amputation

It is likely that too many limbs were amputated, and that the surgeon not possessing reliable means of treating shock and infection caused the death of many men who might otherwise have recovered. Sir Richard Hawkins the Elizabethan sailor in the account of his voyage to the Pacific in HMS *Dainty* in 1593 makes an interesting observation in this respect After his ship had been overpowered by a superior number of Spaniards and had been forced to surrender he writes

> "God so placed the hands of our surgeons (besides that they were expert in their art) that of all our wounded men not one died but was alive the day after our surrender the number whereof was nearly forty and many with eight or twelve wounds and some with more The thing that ought to move us to give Almighty God especial thanks and prayers was that they were cured in a manner without instruments or salves for the medicine chests were all broken in pieces and many of the surgeons simples and compounds thrown into the sea."

This view in favour of early amputation was caused by the fact that the surgeons could not dispose of their patients quickly as it took sailing ships several days or even weeks to reach port Had the surgeons delayed amputation in badly injured limbs sepsis with gangrene would have been the inevitable sequelae so perhaps in retrospect it was most reasonable course for them to adopt

An Illustrative Case Report

Dr Thomas Trotter (1760 1832) who held the post of Consulting Surgeon to the Fleet at the end of the 17th century made a practice of encouraging the surgeons in the different ships of the fleet to send him reports of their cases, and it is through the general adoption of this admirable custom that we have the following account of a most successful piece of surgery under the most adverse conditions contributed by Mr Robert Dunn surgeon to HMS *Stag* in 1798

> "Daniel Leary seaman was by the explosion of a great gun in the act of reloading, thrown into the main chains where he was discovered in the most melancholy plight that ever human being was exposed to both arms appeared to be carried away with a fracture of the humerous near the axilla of the right arm His face breast and head were scorched all over under such sufferings there were very slight hopes that anything could be done for his relief "

Mr Dunn proceeds

> "There is something however in the worst of evils which induces the surgeon to stand forward with zeal and in this instance it was rewarded with success While the helpless patient continued in a swoon the left hand was removed at the carpus
>
> "He was by this time thoroughly sensible of his misery and from the fracture of the right arm being so near the scapula he was told the necessity of losing the arm at the shoulder joint All the violence and obstinacy which seamen exhibit on some occasions were shown by this poor man in opposition to my wishes he was content to die where he was After using every argument with him in vain he called for Captain Yorke and kindly represented the inconsistency of operating below the fracture but all was of no avail and without hesitating any longer it was determined that this painful object should be managed in the following manner although it was transgressing some of the rules of surgery
>
> The surgeon amputated the bit above the wrist that is below the fracture—the fracture of the right humerous appeared transverse the bones of the lower arm were shattered shock had prevented any considerable degree of haemorrhage and very slight compression by tourniquet was used during the operation the bones were found perfectly firm to saw and four blood vessels required securing The rest of the operation was soon finished and the arm placed in the easiest position with a moderate compression on the fracture of the upper arm by a tailed bandage Two grains of Opium were given him

The later course of this case was as follows

> Neither haemorrhage or any untoward symptom intervened the left arm was looked at and dressed the third day was healing without suppuration very little fever ensued wine and soup were given him on arrival at Spithead After three days he was sent on shore to the hospital in the course of two months both arms were completely healed and the fracture united In return for the loss of an eye he enjoys the pension of £20 per annum with a cook's berth in a ship of the line then building.

Trotter himself adds a footnote to this remarkable story

> This hardy son of the ocean lately paid me a visit on compliment to the abilities of his excellent surgeon though maimed and blind of an eye his hardihood of a sea education is unsubdued by his misfortune He said I still receive King's pay and am thank God, hearty and well

Reduced medical category

The fact that this man subsequently found employment as a cook reminds one that this was a general custom in the Navy in the 17th and 18th centuries Men who had been wounded were given preference in employment as cooks and in their non combatant duties The standard required was low but even allowing for this it is difficult to conceive what the Admiralty secretary can have been thinking when he made the following entry in the Minute Book for the 28th September 1692

John Scott who lost both arms on board the *Rupert* is to be remembered for a cook

CASUALTY RATES

On the 1st June 1796—the Glorious First—when Admiral Earl Howe defeated the French fleet 1148 men were killed and wounded out of a total of 17241 personnel The proportion of killed to wounded in this battle was 3 to 1 HMS *Brunswick* suffered the heaviest loss and only HMS *Thunderer* escaped without casualties.

Hill who made a close study of the casualties at the battles of Camperdown the Nile and Trafalgar and compared them with the big actions fought in the First World War at Jutland noticed an interesting point the total percentage of killed and wounded did not differ greatly in the 18th century from those occurring at Jutland (*Table I*)

Though there is little difference in the percentage of casualties in the different actions it will be noted that in the 18th century the numbers wounded far exceeded the numbers killed whereas at the Battle of Jutland the reverse is the case Death by drowning or by the blowing up of a ship accounted for most of the casualties in this action in which there were relatively few survivors In the three battle cruisers *Queen Mary Invincible* and *Indefatigable* almost all the crews were lost there being only six survivors out of a crew of 1264 in *Queen Mary* alone

A SENIOR PHYSICIAN AT SEA—GILBERT BLANE

Sir Gilbert Blane (1749–1834) like Trotter one of the foremost figures in Naval medical history was present at several engagements during the years he spent as Physician to the Fleet under Admiral Lord Rodney However the episode that seems to have impressed him the most was the action against the French fleet under Admiral de Grasse which was fought in the West Indies on 12 April 1782

For two days the British ships had been trying to overtake the French whose object it was to join forces with the Spaniards and thus form a combined fleet of overwhelming superiority Blane describes the scene on board the *Formidable* in the Admiral's cabin at breakfast on the eventful day with the warm morning sun glinting through the great stern windows and tracing patterns of light on the deck as the ship gently rolled as she sailed close hauled through the tropic seas. Conversation was all about the possibilities of the coming battle when it was interrupted by Lord Cranston a volunteer post captain who had come below from the quarter-deck to bring the news that the French fleet was at last coming into range. The party broke up quickly but the physician Blane, finding himself with no particular duties to attend to took up a position on the quarter deck from whence he could command a good view of the action The sight must have been an inspiring one with the British ships on the opposite tack to their opponents and closing fast

Just before the *Formidable* which was in the van came abreast of the French *Glorieux* Admiral Lord Rodney looking round the quarter-deck and finding no other officer nearby summoned Blane and requested him to go below to the lower gun deck and order the guns crews to raise their metal Surely no more deadly a prescription ever emanated from a physician Blane admits that for a moment he was at a loss to understand the order until his classical education came to his assistance and he recalled a couplet from Hudibras

Thus cannons shoot the higher pitches
the lower you let down their breeches

He concluded that the Admiral's wish was that the muzzles of the guns should be depressed so that the shot might strike the enemy between wind and water and gave the gunners the order A few moments later the *Formidable* in breaking the enemy's line passed so close to the *Glorieux* that Blane saw distinctly the cannoneers" throwing away their sponges and hand spikes in order to save themselves by running below while the British guns were served with

Table 1 Comparison of casualties at naval battles

Battle	Total Force	Killed	Wounded	Total Casualties	% Total Force
Camperdown	8221	203	622	825	10 04
The Nile	7985	218	678	896	11 22
Trafalgar	17772	449	1242	1691	9 51
Jutland	60000	6014	674	6688	11 15

unflinching attention Blane was full of admiration for the courage of the British seamen and also for the French Admiral le Comte de Grasse who bore himself so admirably after his defeat and capture One of the post captains Sir Charles Douglas brought the Admiral on board the *Formidable* as a prisoner and introduced him to Blane thus

"Permettez moi mon General de vous presenter notre medecin en chef qui est presque assez habile pour faire revivre les morts'

(*Permit me General, to present to you our chief doctor who is almost able to bring the dead to life*)

to which the Admiral replied in the same light vein

'Et peut-etre pour faire mourir les vivans?'

(*And maybe kill the living?*)

The secondary missile problem

Blane was a shrewd observer and had noted that for every man killed outright there were about three wounded and that the principal causes of wounding were the jagged wooden splinters which were sent flying in all directions when heavy cannon balls crashed into the decks or hulls of the ships The upper decks were screened as far as possible with barricades of hammocks but the shots fired at long range caused the most splinters Shots fired at close range tended to cut clean holes. The chances of being hit by round shot were much less than being hit by splinters This reflects modern experience where the majority of casualties have been caused by flying missiles set in motion by the explosion and not by the explosion itself Burns Blane noted were also very common and were brought about by cartridges catching fire gunpowder blazing up suddenly and scorching those within reach or from carelessness in the handling of powder horns when priming the guns In those days large ox horns were used for this purpose until they were superseded by tin priming boxes on the suggestion of Sir Charles Douglas when he was captain of HMS *Duke*

An early observation on First Aid

Blane also remarked on the frequent deaths he saw from haemorrhage seamen serving on deck could be struck by a missile which lacerated an important blood vessel and die of haemorrhage before they could be taken below to be treated by the surgeon

"Would it not be more advisable Blane asked at all times to have some intelligent person a warrant or petty officer stationed on the quarter deck who should carry in his pocket some such instrument All he needed to know was the situation of the great arteries in the arm and thigh for with information alone the blood might be stopped by a handkerchief tied tight round the limb

This is probably the first reference made to the use of a tourniquet in treating haemorrhage

DISCUSSION UPON SOME SPECIFIC ENGAGEMENTS

Some encounters between individual ships which are of special medical interest are now described the first is probably unique because we find the surgeon assuming command of the ship and playing no small part in the ultimate victory

The surgeon as a combatant—no Geneva Convention

In the spring of 1801 Captain Lord Cochrane was in command of HMS *Speedy* a vessel engaged in harassing enemy coastal operations in the Mediterranean Early one morning she fell in with the Spanish frigate *Gamo* a vessel of over 600 tons with a crew of 319 men and an armament of 32 guns Against this the *Speedy* could only muster 54 men and 14 guns Determined to fight Lord Cochrane withheld his fire until the two ships were close together when he locked *Speedy's* yards in the enemy's rigging and in this position gave her a broadside The guns had been doubly and in some cases trebly shotted and being elevated they took a heavy toll in the dead and wounded on the main deck of the Spaniard *Speedy* then sheared off and bore another volley of musketry This manoeuvre was repeated twice and then finally it was decided to board Every man was required so the surgeon Mr Guthrie came forward in the emergency gallantly layine down his scalpels and tourniquets and volunteering to take the ship's helm and act as steersman Cochrane remarked of his action

> leaving the doctor there for the time being, both commander and crew of the *Speedy* in a few seconds no man was on the enemy's deck a feat rendered more easy as the doctor placed the *Speedy* close alongside with admirable skill [2]

After a spirited fight the enemy laid down their arms and surrendered the losses on the Spanish ship being 15 killed and 41 wounded and on the British side only 3 killed and 18 wounded

The *Chesapeake* and the *Shannon*

Another single ship encounter that has become famous in British Naval history because of the brevity of the action and the fearful casualties sustained was that occurring between HMS *Shannon* and the US frigate *Chesapeake* which took place off Boston on 1 June 1813 and became one of the most conclusive actions fought by the British in an otherwise mediocre display against the enemy All history books refer to it as a great feat of British arms and indeed it was one of the few satisfactory engagements fought in the war of 1811 14 between Britain and the USA

The *Chesapeake* had just returned from a raiding cruise of 15 days in which she had captured five British merchantmen She was refitting in Boston Harbour while the British ship HMS *Shannon* cruised up and down outside the entrance to the port The latter vessel had been at sea a long time and was short of both water and provisions Her ensign was faded and worn but her captain later Admiral Philip Bowes Vere Broke then a comparatively young man of 37 had brought the crew into a fine state of fighting efficiency

The ships were evenly matched each carrying 23 broadside guns The *Shannon* carried 306 men against the *Chesapeake's* complement of 376 Early on the morning of 1 June 1813 Captain Broke eager to bring matters to a head between the two ships despatched a letter to the Commanding Officer of the *Chesapeake* Captain Lawrence pointing out that the *Chesapeake* now appeared ready for sea and requesting

> that you do me the favour to meet the *Shannon* with her ship to ship to try the fortunes of our respective flags

After fixing a suitable rendezvous and giving assurance to Lawrence that no other British ship would interfere Broke concluded

> I entreat you Sir not to imagine that I am urged by some personal vanity in the wish of meeting the *Chesapeake* or that I depend only upon your personal ambition for your acceding to this invitation We have both nobler motives

Having despatched this remarkable letter in shore with a Captain Slocum a discharged prisoner the *Shannon* with colours flying lay off the harbour lighthouse and awaited results

Captain Broke went himself to the masthead and there observed between 12 noon and 1 pm the American ship firing a gun and making ready for sea Then the *Chesapeake* a magnificent sight with three ensigns flying came sweeping out of the harbour and bore down on the *Shannon*

Before sending his men to their action stations Broke mustered them aft and addressed them with a few well chosen words reminding them of the sentiment that had been heard in some places that the English had forgotten the way to fight, concluding

> But you will let them know today there are Englishmen in the *Shannon* who still know how to fight!

Approaching to within the range of a pistol shot the *Chesapeake* rounded on the starboard side of her opponent while on board the *Shannon* Captain Broke walking forward gave orders to the captains of the main deck guns to fire on the enemy as soon as the guns bore on his second bow port and in another moment the ships were closing fast The *Shannon* now opened the action by firing in rapid succession all her broadside guns at the enemy The effect of this was devastating the *Chesapeake* was swept by a hurricane of shot and splinters tearing through her sides and rigging so that of the 150 men on deck almost 100 were instantly put out of action Most unfortunately for the Americans their Commanding Officer Captain Lawrence was shot through the abdomen by a musket ball The *Chesapeake's* tiller ropes and steering gear together with the jib sheets were shot away and in this crippled and helpless condition she received *Shannon's* second and even more devastating broadside Now completely out of control she drifted until she came into contact with the *Shannon* whereupon Captain Broke springing forward led a boarding party on to her deck A desperate hand to hand encounter ensued in which Broke was struck down by a sabre cut to the head The two ships drew apart and for a moment owing to the confusion it looked as if the English party marooned on the enemy's deck might be overcome but they reformed ranks and fought on while the men remaining in the *Shannon* bore down on the Americans with a discharge of musketry Without a leader and overwhelmed by the combination of the two broadsides and the determined onslaught of the boarding party the battle was now over and a victory won for the English within the remarkably short time of 13 minutes from start to finish

Fig 1 Analysis of wounded in HMS *Shannon* 1 June 1813

Gun shot wounds		**Blows and contusion**	
Head	4	Abdomen	2
Shoulder	2	Concussion	2
Chest	1	Ankle	1
Arm	5	Forehead	1
Hand	2		6
Abdomen	2		
Pelvis	2	**Canister and grape shot**	
Thigh	5	Head injury	1
Leg	2	Shoulder	1
Foot	1	Arm	2
	26	Hand	1
Fractures		Thigh	3
Arm	2	Knee	1
Patella	2		9
Femur	1	**Splinters**	
Bayonet		Head injuries	3
Abdomen	2	Shoulder	3
Sabre		Back	1
Head injury	3	Chest	2
		Thigh	2
		Knee	1
		Feet	1
		Hip	1
			14

The price of victory

During the decisive 14 minutes 229 men had been either killed or wounded in the two ships a proportion which represented about 30% of the total forces engaged The American frigate suffered the more severely losing 47 men killed and 99 wounded whereas the *Shannon* lost 24 men killed and 59 wounded Dr Jack, the surgeon of the *Shannon* who if a trifle eccentric in his ways was extremely able joined with the medical staff of the *Chesapeake* to attend to the wounded and later produced a list of casualties in the *Shannon* showing the numbers and types of wounds (*Figures 1 and 2*) It is interesting to note the absence of injuries attributable to buras and the frequency of splinter wounds

THE INJURY TO CAPTAIN BROKE

Captain Broke had received a sabre cut over the left side of the head his skull being fractured and the brain protruding some 3 inches It also seems he may have suffered from temporary aphasia as an immediate sequel Dr David Rowlands surgeon to the Royal Hospital at Halifax Nova Scotia, to which port *Shannon* escorted her prize reported that on his arrival Broke was only able to converse in monosyllables Nevertheless Broke survived and regained much of his good health for he lived to the age of 65 Some years before he died in 1820 seven years after the action with the *Chesapeake* Broke now Admiral was unfortunate enough to receive another head injury this time as a result of a fall from a horse. For several days he lay in a state of clouded consciousness and complained of parasthesia in the left arm and leg.

> I was stunned by the fall I certainly got up unconscious of injury and must have walked about a quarter of a mile But I remember nothing of that walk and my recollection commences with me sitting down in a room and telling my mother how I had had a fall In a few minutes I began to feel some sense of stupor and sent for a surgeon who bled me in the left arm taking away some 10–12 oz of blood This might have been one and a half hours after the accident The stupor increased considerably I was permitted to go upstairs again to go to bed Whilst pulling my clothes off a violent retching and vomiting came on and then my memory fell again for several

Fig 2 Fatal Casualties in HMS *Shannon* 1 June 1813

G J L Watt—1st Lieut	—Grape shot carried away top of head
Geo Aldham—Purser	—Grape lodged in lower part of abdomen Lived one hour
John Dubb—Capt Clerk	—Cut across abdomen by a grape and hips
Geo Gilbert—AB	—Shot shot went through his middle
Wm Burtles—ditto	—Grape lodged in the back part of chest Lived several hours
Neil Gilchrist—ditto	—Cut in two by a thirty two pound shot
Thos Selby—ditto	—Head shot off
James Long—ditto	—Shot in the head and belly
John Young—ditto	—Cut in two on board Chesapeake
James Wallace—ditto	—Musket ball through the abdomen Lived thirteen hours
Joseph Brown—ditto	—Shot through the neck
Thos Barr—Ordinary	—Head shot off
Michael Murphy—ditto	—Shot through the middle on board Chesapeake
Thomas Molloy—ditto	—Grape shot through the middle
Thos Jones—ditto	—Grape through the middle on board Chesapeake
John O Connelly—ditto	—Grape shot through the head on board Chesapeake
Thos Barry—1st class Boy	—Cut in two by a shot shot
J McLoughlin	—Grape shot in the neck
Wm Penny	—Grape shot in the body Marines
Samuel Millard—Corporal	—Grape shot
James Jeynes—Private	—Grape shot in the belly
D Sedin—ditto	—Grape shot in the belly
Wm Young—ditto	—Shot from below by a musket whilst standing on a grating on board Chesapeake Supernumeries
W Morrissay	—Grape shot in the belly
John Moriarty	—Grape shot in the belly
Thos Garmond	—Grape shot in the belly

honrs, bnt the following morning I was perfectly clear again

In the evening of the day following the accident I felt an extreme sense of cold in my legs and feet and left hand and in the course of the next day I discovered that the whole of the left side was strangely affected."

Consultant opinion

Admiral Broke's family doctor sent him up to London to consult with Sir Astley Cooper the famous physician who replied to the doctor as follows

"On the left side of Admiral Broke's head the sabre cut has depressed the bone and compressed the brain The edges of the fracture are rather displaced and have long since united All expectation of any exchange in that part must be abandoned not so upon the right side There the mischief has been an extravasation of blood upon the brain or its membranes"

It therefore seems probable that the effects of a haematoma compressing on the right hemisphere were added to the effect of the old brain injury sustained seven years previously The remarkable thing is that Admiral Broke should have survived so long without surgical treatment to remove the clot

Broke's name has been perpetuated in the Service in the traditional manner by naming ships after him and the engagement which Admiral Evans then Captain of HMS *Broke* a destroyer fought in the First Great War brought the name again into prominence as a synonym of exceptional courage and devotion to duty

NELSON'S SURGEON

One cannot conclude this brief and embryonic sketch of surgical aspects of naval warfare in the days of sail without reference to Admiral Lord Nelson and the manner of his death at the Battle of Trafalgar The well known details were given by Dr William Beatty surgeon to HMS *Victory* During the action Dr Beatty was kept busy for the ship had sustained 159 casual

ties—57 killed and 102 wounded As soon as he could he hastened to the side of the wounded Commander in Chief who said

> 'Ah Mr Beatty! You can do nothing for me I have but a short time to live my back is shot through,'

and entreated the surgeon to attend to the other casualties A short time later Nelson called Beatty back again

> Mr Beatty I have sent for you to say what I forgot to tell you before that all power of motion and feeling below my breast are gone.

This is an interesting observation that a patient on the point of dying should display an enquiring attitude to his condition but Admiral Nelson had always interested himself in medical matters and in the health of his men He did not deprecate the presence of doctors on ships as many commanders did and some of his closest friends were indeed his surgeons and physicians, notably Drs McGrath and Beatty and Leonard Gillespie who had served as Physician to the Fleet before Trafalgar A short while previously a young seaman in the *Victory* had received similar injuries which damaged his spinal cord and Nelson had been greatly interested in the case and in Beatty s description of the manner in which the symptoms had been reproduced Now unfortunately Nelson was to realise that it was his turn to suffer the same misfortune In calling Beatty back to his side Nelson was not indicating that he expected Beatty to save his life but simply to let Beatty know that he (Nelson) knew he was a good doctor and interested in the clinical signs and symptoms he showed

There is evidence from Beatty s journal that he must have known Nelson intimately for he refers to small personal details that could only have been apparent to a close friend For example he refers to Nelson s custom of sleeping only two hours at a time and of how he would drink only a little wine and eat sparingly and of how he might come down from the upper deck with his feet soaked through and just take off his shoes and walk about on the carpet of his cabin till his feet were dry Commenting on the state of Nelson s internal organs after his death, Beatty said

> "Indeed, all his vital parts were perfectly healthy in their appearance and so small that they resembled more those of youth than a man who had attained his forty-seventh year '

Postcript

Finally the following quotation from The Seaman s Grammer written by Captain James Smith in the year 1652 would seem appropriate

> Well Master the day is spent,
> The night draws on let us consult
> Chirurgeon look to the wounded and
> wind up the slain with each a
> weight or bullet at their heads
> and feet to make them sink
> and give them three guns for their funerals "



The Annual Naval Health Inspectors' Meeting was held at the offices of Flag Officer Portsmouth on 28 and 29 September 1989. Those attending were, from left to right: MT1 D Arnold, CMT N Martinez, MT3 D Baxendale, Mr B Tanner, MT1 B Richards, Mrs S Baxendale, LMA D Wilson, Mr J Kettlewell, MT3 T Martin, Lieutenant A Hughes, MT3 D Wallington and CMT S Allison.

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Space Motion Sickness

B J W Pingree

Abstract

Space Motion Sickness (SMS) is the malady which frequently occurs shortly after attainment of sustained exposure to hypogravity. It is characterised by a variety of symptoms which may proceed to nausea and eventually vomiting. Natural adaptation usually occurs if exposure to hypogravity is maintained. The condition appears to be the manifestation of motion sickness that is specific to hypogravity. It is associated with otolith-canal and otolith-eye conflict. SMS may have operational significance in impairing the performance of spacecraft crews. The condition is likely to be amenable to treatment with anti motion sickness drugs. It may be possible to reduce any operational effects of SMS by suitable crew selection and training procedures.

INTRODUCTION

From the very earliest days of man in space a condition which to the sufferer is reminiscent of seasickness has afflicted up to 50% of all cosmonauts and astronauts[1–]. Although there was some dispute from the outset as to the true nature of this condition and indeed aspects of it remain obscure it is now generally accepted that the malady is a manifestation of the broader phenomenon of motion sickness[1,2]. This in turn is the disorder which typically proceeds eventually to nausea and vomiting associated with travel in the variety of transport modes that man has developed and adopted ranging from aircraft to ships and cars and even including camels[3,5]. The particular variant of motion sickness that afflicts space travellers is now commonly called space motion sickness (SMS) or somewhat less causally the space adaptation syndrome (SAS)[2].

Surgeon Commander Pingree is Principal Medical Officer HMS *Neptune*

FEATURES OF SMS

SMS occurs following sustained exposure to a reduced gravity environment such as exists in spacecraft in earth orbit or proceeding to destinations beyond[2,7]. It is associated with such symptoms as nausea, stomach awareness or feelings of being hot or cold. These may progress to vomiting sometimes with surprisingly little by way of prior nausea[3,4]. Pallor is an almost invariable sign of motion sickness but is not a marked feature of SMS possibly because in the microgravity environment there is a headwards shift of blood and body fluid which may prevent the development of pallor[4]. Notwithstanding such fluid shifts a relative pallor has been observed in SMS when suitable instrumentation has been used[8].

SMS can start to develop within one to two hours of weightlessness being attained but some sufferers may not be aware of symptoms until the second day of flight[2]. In general symptoms begin during the first day of flight plateau between 24 to 48 hours and gradually diminish between approximately 48 to 96 hours[2]. It would appear therefore that the rule is for the condition to be self limiting as exposure to weightlessness is maintained.

AETIOLOGY

SMS occurs in the weightless environment of space travellers who effectively are in sustained free fall. Indeed it would appear to be the manifestation of motion sickness appropriate to such a weightless environment[3]. Head movements are considered to be important provocative contributory factors in the development of the condition[2,4]. Thus while SMS was experienced from the outset in the Soviet

space missions it was early in the Apollo and post Apollo craft that the American astronauts suffered the phenomenon[2] In the early American craft it was likely that head movements were limited by the restricted size of the Mercury and Gemini spacecraft and SMS was accordingly not experienced in these[9] It has also been suggested that afferent abdominal signals resulting from headwards displacement of the abdominal viscera, with additionally a contribution from distension of these viscera may also be implicated in the development of the condition[4] However the redistribution of body fluids which occurs in weightlessness is unlikely to be the cause of SMS[10]

NEURAL MIS-MATCH

The occurrence of the phenomenon of motion sickness has been described by reference to a neural mis-match concept which has been developed and refined over the years[5 6 11 12] This concept relates to the role of the sensors which provide the brain with information to achieve orientation of the body with respect to its surroundings These sensors are the eyes the semi-circular canals which detect angular movement the otoliths which detect linear acceleration including gravity and the musculoskeletal proprioceptors The neural mismatch hypothesis states that in an unfamiliar motion environment the information being relayed to the brain by these sensors is mutually conflicting and at variance with past experience as represented by a neural store of expected signals The presence of such variance constitutes a mis-match between current and past experiences which is detected by a central comparator and it is the sustained presence and magnitude of this mismatch that leads to the development of motion sickness As exposure to motion continues the neural store is progressively updated eventually accepting the initially unfamiliar motion environment as the prevailing normal As this updating occurs the magnitude of the mis-match diminishes adaptation proceeds the severity of the condition abates and finally subsides completely

It follows from the neural mis-match hypothesis that on return to a non motion environment an adapted individual is likely to experience symptoms once more as a mis-match is detected by the brain in the now unfamiliar static environment Such a phenomenon does indeed occur and is known as mal de débarquement[1] but it is usually no more than a mild event compared with the preceding sickness on initial exposure to motion Space travellers returning to earth sometimes suffer a motion sickness condition as a consequence of re exposure to gravity which might be termed 'earth sickness' This comprises a variety of symptoms including nausea and occasionally vomiting, which are aggravated by head movement but they are generally much less severe than those of SMS and are short lived[1]

The occurrence of mal de débarquement gives support to the neural mis match concept and its mild nature is explained by the readiness and speed with which the neural store readapts to the non-motion environment with which it has such strongly retained familarity on the basis of long experience Neural mismatch sufficient to cause motion sickness can occur between the eyes and the otoliths of the vestibular system as in crew members in spacecraft lacking a familiar external view of surroundings Similarly there can be mis-match in weightlessness between the two components of the vestibular system, the otoliths and the semi-circular canals and the conflict from this particular mis match may be the predominant contributor to SMS[3] A number of possible mismatch conditions can arise in different motion circumstances[11 12,13]

The mis match hypothesis also includes the concepts of receptivity adaptability and 'retentivity' which contribute to inter subject variability in susceptibility[14] In an individual with high receptivity the sensory response to motion exposure evokes a relatively more powerful subjective experience This results in a more intense mis-match and such an individual is more likely to suffer from motion sickness than the less receptive Adaptability describes the rate at which an individual adapts to an unfamiliar motion environment in terms of the central processes of sensory re arrangement Finally retentivity addresses the manner in which adaptation is retained between periods of exposure to provocative motion

THE NEURAL MIS MATCH OF SMS

In the weightless environment the otoliths are deprived of the effects of the familiar gravity vector which they normally continuously detect and transmit centrally in the terrestrial setting. In space therefore on rotating the head there is potential conflict between otoliths on the one hand and semi-circular canals on the other In the absence of a gravity vector head rotation

will not be detected by the otoliths but it will be sensed by the semi-circular canals resulting in an otolith-canal conflict. Further conflict is likely to arise between the eyes and the otoliths in weightlessness. Thus while the eyes register the apparently stable visual environment of the spacecraft interior there is implied motion in the central interpretation of the absence of otolith signal as sustained motion in free fall. Such conflicts described may well be exacerbated by absence of proprioceptive signals appropriate to downwards in weightlessness [14,15].

During early exposure to weightlessness when SMS symptoms are present head movements in pitch and roll appear to be particularly provocative in exacerbating nausea and producing vomiting, while reduction of these by conscious control has been reported as offering some relief to sufferers[3,4,8]. Indeed it has been shown that head movements are to some extent minimised and suppressed without conscious effort during periods of SMS[8]. It has also been found that visual cues become even more dominant in space than they are in a terrestrial setting[8]. In the absence of gravity erstwhile ceilings and walls can appear visually acceptable as floors, and are frequently so interpreted often with surprising and disconcerting rapidity adding a further element of neural mismatch[4,8]. Such visual re-interpretations are the more likely if other crew members happen to be orientated in a way that suggests their correctness. Some SMS sufferers find it helpful to keep their eyes closed when they feel at their most susceptible[4,8] and to avoid looking out of the spacecraft when earth might be orientated at variance with their expectations and the sight of it therefore additionally provocative.

As well as visual and vestibular sources of motion conflict there are also changes in proprioceptive signal activity in weightlessness which are at variance with what terrestrial experience has led the hypothesised neural store to expect. This changed pattern in which the range of body gravity receptors is no longer stimulated adds to the centrally perceived mis-match and presumably therefore also to the nauseogenicity of weightlessness. Indeed it has been reported by a number of astronauts that SMS symptoms are reduced if substantial body contact can be made with parts of the spacecraft interior particularly by wedging the body into a suitable space or corner[4].

NEURAL ADAPTIVE CHANGES TO WEIGHTLESSNESS

As exposure to weightlessness continues the neural mis-match concept would postulate a progressive updating of the hypothesised neural store so that the magnitude of any mis-match continuously decreases and finally disappears completely when adaptation is complete. It would appear that such adaptation as well as updating the neural store brings into operation other re-interpretive phenomena specific to exposure to microgravity. Because of the absence of a gravity vector the otoliths become valueless for postural control and this is subserved entirely by vision. Furthermore the otoliths appear to respond to head rotation by interpreting this as a linear displacement[16] with accompanying changes in the characteristics of certain visual reflexes. When adapted to weightlessness individuals have an immunity to the nauseogenic effects of cross-coupled motion. Such motion occurs when head rotation is made in a plane at right angles to a plane of concurrent rotation[2]. The resultant immunity persists on return to earth for several weeks[17]. However despite this particular aspect of the adaptation process it should be noted that susceptability to seasickness persists and in the case of American astronauts has occurred shortly after return to earth from orbit[18]. These adaptive changes give further weight to the view that the key feature of the process of adaptation to weightlessness is the discounting of otolith in favour of visual information[17]. Finally falling, which in the terrestrial environment is a most definite sensation activating particular protective reflexes appears to be re-interpreted as being a linear acceleration which is not qualitatively different to a linear acceleration occurring in any other direction [9].

INCIDENCE

The incidence of SMS in the early American and Russian manned spacecraft has been summarised[2] and ranges from none in the Mercury and Gemini craft to almost 60% of exposed individuals exhibiting symptoms in Skylab and Voskhod. As has been noted previously the experience from the early American craft is regarded as rather unrepresentative[1] and the low incidence of SMS in astronauts in the Mercury and Gemini craft is attributed to the restricted mobility of crew members and their limited ability to see outside. More recent American experience with the Space Shuttle has been summarised[21] the incidence of SMS dur-

ing a first Shuttle flight for 85 crewmembers was 67% (57 cases) with 26 mild cases (30%) 20 moderate (24%) and 11 severe (13%) Differences were found between males and females crew positions within the craft (Commander Pilot Mission Specialist etc) and age groups These differences were not statistically significant ($P<0.05$) in the population sizes concerned but suggest future lines of research into the mechanism prevention and treatment of SMS The 26 crewmembers who undertook a second flight showed a reduction in SMS incidence to 46% but tha change was not significant compared with the first flight Nine crew members (35%) showed a reduction in SMS severity comparing first and second flights There was no significant difference in the mean time between flights for crew members with SMS versus asymptomatic crew members Variability in crew member training and flight experience may explain some of the differences observed

THE OPERATIONAL SIGNIFICANCE OF SMS

A phenomenon which causes nausea and vomiting in its sufferers results in them restricting their mobility and which can afflict all members of a spacecraft simultaneously is likely to have a deleterious impact on crew and mission performance For this reason SMS is a factor which must be recognised and allowed for in space travel In practice the extent to which performance has been impaired in past missions does not appear to have been rigorously quantified and such impairment as occurs may be less than at first might be thought[2] In general it is known that the overall impact of SMS on mission operations in the US space programme has been minimal although there are documented instances when the presence of SMS has required programmes of work to be rescheduled[2] It should perhaps be recognised, however that crew members suffering from SMS may have an associated performance impairment which while not perhaps seriously impeding ability in short duration tasks may impair vigilance and other faculties requiring sustained application for effective results It should be noted that facts on this matter are hard to come by[7] as indeed they are for the effects of motion sickness on performance generally[6] although it is important to note that most laboratory performance testing is done on short tasks to which individuals may be able to apply concentration which might be more difficult for longer tasks Any effects of SMS on performance are likely to be most marked in short duration flights of a few days only in that adaptation to the condition generally occurs within 3 4 days The implication of SMS for extravehicular activity must also be remembered and it is advised that this should be done only by immune or adapted individuals

THE NEUROPHARMACOLOGY OF MOTION SICKNESS

It has been recognised for some time that motion sickness may sometimes be controlled prophylactically by drugs Those drugs that show efficacy have one or more of the following actions

a Anti-cholinergic eg hyoscine
b Anti-histamine (H_1 antagonist) eg cinnarizine cyclizine promethazine.
c Sympathommimetic eg ephedrine

It is thought that the efficacy of these drugs depends on central activity rather than on any peripheral actions[12] although these latter may also occur without contributing to efficacy The central organisation of the vomiting response in motion is dependent on the vestibular nuclei the vestibular cerebellum the chemoreceptor trigger zone (CTZ) located in the area postrema of the fourth ventricle and the vomiting centre, this last being an ill defined entity anatomically located in the brain stem[2,5,8,11,13,24]

The motion sickness prophylactic drug that has received most detailed study to date would appear to be hyoscine It was possibly the earliest drug to be shown to have such activity[11,13] with consistent comparative effectiveness in relation to other candidate prophylactic drugs[25,26] Indeed, it is frequently regarded as a reference drug against which others might be compared.

It has been proposed[23] that anti-motion sickness drugs act on a hypothesised balance between central cholinergic and adrenergic systems which are stimulated and which are in competition as vestibular impulses are registered during exposure to motion Indeed when an excess of central acetylcholine is brought about by the administration of a cholinesterase inhibitor such as physostigmine a physiological response that resembles motion sickness is produced[27] If acetylcholine activity is reduced by drugs or if adrenergic activity is similarly increased motion sickness may be prevented H_1 blocking anti-histamines have to varying degrees, inherent anti-cholinergic activity[28] although motion sickness efficacy does not ap-

pear to correlate with anti-cholinergic potency[35] The central action of anti histamines may be to block H_1 receptors that transmit a histamine mediated augmentation of central cholinergic activity[17] Promethazine a phenothiazine with marked anti histamine potency is almost alone among the phenothiazines in possessing efficacy in motion sickness[17] The phenothiazines are thought to prevent vomiting (from causes other than motion exposure) through their blocking action on dopamine receptors in the CTZ[17] It should be noted however that other dopamine antagonists have given disappointing results in motion sickness Thus despite initial reports of benefit from metoclopramide[19], later studies have shown this drug to be ineffective Domperidone has only been reported as augmenting the action of cinnarizine[36] Mention should finally be made of the range of 5 HT antagonists which are being developed by the pharmaceutical industry[34] These have powerful anti-emetic properties and they may therefore be active in motion illness[32] although a recent laboratory trial with a drug of this class failed to demonstrate superiority compared with placebo[33]

DRUG TREATMENT OF SMS

The drugs that have received most usage in SMS are for astronauts hyoscine (scopolamine US Pharmacopeia) hyoscine in combination with amphetamine (scopdex) combined promethazine and ephedrine and for cosmonants Dramamine[1] These have been used both prophylactically and to relieve established SMS Subjectively they appear to be beneficial but the total numbers of individuals treated with drugs remains modest in relation to the number required for a controlled clinical evaluation and no such evaluation has yet been undertaken in weightlessness or space to date[2] It is of interest to note that metoclopramide has been taken in space but judged to have been ineffective[4] This conclusion is consistent with the lack of benefit from metoclopramide in other manifestations of motion sickness[34]

The use of drugs to treat SMS has performance implications since drugs themselves may induce performance penalties which would not otherwise occur When given according to the regimens recommended, hyoscine may produce central sedation and the peripheral antiholinergic effects of dry mouth and dilation of the pupil causing blurred vision[38] The centrally sedating properties of hyoscine may well account for the psychological performance impairment that has been demonstrated with it For example when given in a laboratory non motion environment it produced impairment to measures of memory and sustained attention although psychomotor function as assessed by the ability to track a target appeared unimpaired[35] However it is possible that combinations of drugs might be identified which do not incur a performance penalty in their use such as promethazine with amphetamine[16,37] and hyoscine and amphetamine[17]

OPTIONS FOR MINIMISING SMS

Action may be taken at a number of stages to prevent or minimise the occurrence of SMS in space travellers Such measures as are available can be applied either before flight or during it Measures prior to flight include appropriate selection of candidates for spaceflight, and suitable training schedules in preparation for flight A good indicator of future resistance to SMS is a past record of resistance to SMS since symptomatology may decrease with repeated exposure[1,7,11] For candidates with no previous space flight experience, a number of nauseogenic laboratory and aircraft flight procedures have been proposed as predictive but in practice none of these appears as useful as the results of wearing laterally inverting prismatic spectacles Resistance to the usually eventual nauseogenic effects of wearing such spectacles appears to correlate closely with in flight resistance to SMS[9] although this conclusion is based on work in four subjects only

Given that appropriate care has been taken with crew selection it is likely that procedures can be instituted prior to spaceflight to initiate and accelerate the adaptive processes which occur in space An obvious measure would be repeated exposure to zero g parabolic flights in aircraft while making provocative head movements However an individual's response to such exposure is not predictive of what will occur in space and there is no evidence that if increased tolerance to such exposure occurs this is likely to carry over to spaceflight[31]

An interesting approach to preparing for weightlessness is that being pursued by the developers of a Preflight Adaptation Training (PAT) system[28] This aims to reproduce in a crewman's terrestrial surroundings the movements perceived on head rotation in an individual adapted to weightlessness In such an individual otolith signals from head rotation are apparently interpreted by the brain as indicating linear motion.[16] In the PAT system

for example a leftward head roll results in translation of the visual scene toward the left without rotation ie the vertical axis of the scene remains aligned with the vertical retinal meridian. However, only limited success has been achieved with this concept to date and indeed it is questionable as to how well an experience of this type, with otoliths responding as in a normal gravity field, can prepare for weightlessness At the least it would seem that the PAT approach would offer more hope of success if conducted under weightless conditions in parabolic flight

It has been demonstrated that airsickness may sometimes be overcome by repeated laboratory exposure to graded levels of cross-coupled and linear oscillatory motion[39] Although such motion especially the cross coupled element does not necessarily reproduce the nauseogenic aspects of aircraft motion it is found that tolerance to such laboratory motion does sometimes transfer to the aircraft environment In analogous fashion it is possible that suitable desensitising motion profiles might be defined which will increase the resistance of space travellers to SMS Such a possibility of desensitisation is necessarily conjectural at this stage and the concept will require a programme of investigative work to demonstrate if it is attainable.

The control and suppression of head movements and care in avoiding disturbing visual disorientation have been discussed already and it is emphasised that these are important aspects in the reduction in incidence of SMS Additionally the reassuring effects of body contact with part of the spacecraft interior has been mentioned Complementary to this latter measure are techniques to reproduce familiar normogravic proprioceptive signals by for example elasticated seat straps loading the feet by suitable footwear[3] or the application of elastic loads to the cervical region[3] (which also limit head movement), While an objective controlled evaluation of these measures as aids to reduce the incidence of SMS is necessarily some way off because of the small numbers of subjects involved to date such measures are straightforward readily implemented and where judged subjectively to be of benefit are probably worth providing

ARTIFICIAL g

It is possible for gravity to be simulated completely or partially by the application of rotation to a spacecraft Such a technique if sustained, could overcome some of the problems of weightlessness in particular bone demineralisation and possibly cardiovascular deconditioning. However in a rotating spacecraft, nauseogenic cross-coupled phenomena are likely to occur to crew members who perform head movements (This nauseogenicity could be attenuated by a prior period of adaptation to weightlessness) The acceleration resulting from rotation is the product of the rotation radius r and angular velocity squared w^2 Cross coupled effects and those occasioned by changes in r consequent on movement within the interior of the aircraft are likely to be minimised by achieving artificial g over as long a radius as possible to obtain the desired value of rw^2 It is likely that rotation induced gravity will be shown to be more appropriate to spacestations than spacecraft and to be used to control non SMS sequelae of weightlessness However the application of short term controlled but reducing artificial gravity could permit a more graded exposure to weightlessness than is achievable under present operating conditions and this of itself might be a means of avoiding the development of SMS

CONCLUSIONS

1 SMS is the manifestation of motion sickness appropriate to hypogravity and comprises a range of symptoms which can include malaise nausea and vomiting

2 When it occurs SMS is a feature of the early phase of exposure to hypogravity

3 Adaptation occurs to the nauseogenic and related effects of hypogravity so that individuals who succumb to SMS eventually recover if exposure to hypogravity is maintained

4 Adaptation usually occurs within 4 days of attaining hypogravity and SMS does not then occur if hypogravity exposure is sustained even if this exposure is prolonged

5 Up to 60% of personnel attaining hypogravity for the first time or returning to hypogravity after a period of some months after prior exposure might be expected to suffer SMS symptoms

6 Current earth based procedures have not been shown to be effective in predicting SMS susceptibility in individuals prior to spaceflight or in achieving a beneficial prior adaptation to the otherwise nauseogenic effects of hypogravity

7 SMS is likely to have a deleterious effect on crew performance Where performance is

affected this is more likely to relate to tasks requiring sustained vigilance and application than to short duration activity

8 The drugs that have been shown to be effective in reducing the incidence and severity of other forms of motion sickness appear to have comparable efficacy in SMS The numbers of sufferers treated to date are too small to enable drugs to be ranked in order of efficacy but American preference is for a combination of hyoscine with amphetamine (seopdex)

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The diary of Assistant Surgeon Henry Piers, HMS *Investigator*, 1850–54

Ann Savours

(Based on a paper originally delivered at the International Symposium on the History of Maritime Medicine Düsseldorf 30 August 1986)

Summary

From the 16th to the mid 19th century many voyages were made from England to discover a North West Passage between the Atlantic and the Pacific oceans The *Investigator* was one of some 40 vessels that searched for the lost North West Passage expedition of 1845–48 under the command of Sir John Franklin in HM Ships *Erebus* and *Terror* which became beset among what are now known as the Canadian Arctic Islands The Investigators found no trace of Franklin but were the first to traverse the North West Passage although their ship had to be abandoned in Mercy Bay on Banks Island after two winters there The diary of Assistant Surgeon Henry Piers from the manuscript collection of the National Maritime Museum Greenwich is here examined Reference is also made to the narrative and report published by the senior surgeon of the *Investigator* Dr Alexander Armstrong

INTRODUCTION

After Napoleon's defeat and exile in 1815 when the clangour of battle was stilled the western world settled down to decades of relative peace under the watchful eyes of the Royal Navy It was then that the search for the North West Passage was resumed under the auspices of the Admiralty and ships were despatched to try to pass via the North Pole or north of the Americas from the Atlantic and into the Pacific Ocean Needless to say the North Pole route proved impossible and efforts were largely concentrated on finding a seaway north of the American continent Three naval expeditions under the command of Sir William Edward Parry two expeditions overland through northern Canada led by Sir John Franklin a private expedition commanded by Sir John Ross and the land expedition of Messrs Dease and Simpson of the Hudson's Bay Company resulted in the mapping and charting of most of the mainland coast of America and of a formidable number of the islands inlets and straits composing the Canadian Arctic archipelago

It must here be emphasized that owing to the maze of islands north of the American mainland there are in fact not just one but several North West passages which vary in accessibility according to ice conditions and to the draught and power of the vessel concerned

The map (*Figure 1*) shows what had been achieved by 1845 the year in which HM Ships *Erebus* and *Terror* departed from the Thames to seek the final link between the eastern and western ends of the North West Passage These ships were under the command of the veteran Captain Sir John Franklin Royal Navy The non-emergence of the *Erebus* and *Terror* either through the Bering Strait and into the Pacific or back to Baffin Bay and the Atlantic caused relief expeditions by land and sea to be sent north in 1848 Thus the search for the North West Passage came to an end and the Franklin Search of over a decade began [1]

ASSISTANT SURGEON HENRY PIERS

Having briefly set the scene it is time to

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Fig. 1 The North West Passage region as known in 1845 map illustrating a paper by R J Cyriax and J Wordie (Geographical Journal Vol 106 1945 171)

introduce our surgeon diarist. He was Henry Piers Assistant Surgeon in HMS *Investigator* (Captain R M McClure) which was despatched in 1850 by the Admiralty with her senior consort HMS *Enterprise* (Captain Richard Collinson) to sail via the Straits of Magellan and the Bering Strait to search for Franklin from the Pacific end.[2,3] Born on 3 June 1818 Piers was aged 31 when the *Investigator* was commissioned in December 1849. He had obtained his London diploma in 1840 and qualified as Assistant Surgeon in the Navy in 1842 aged 23 years. Between 1842 and 1848 he served in the *Cleopatra* the *Ias* and the *Fearless* (additional for Melville Hospital Chatham).[4] From his diary one gathers he had also served in warmer climes.

The senior surgeon of the *Investigator* was Dr (later Sir) Alexander Armstrong[5] who was to publish a personal narrative of the voyage[6] as well as a smaller book written for the profession on naval hygiene and scurvy.

THE VOYAGE OF THE *INVESTIGATOR*

The *Investigator's* voyage of 1850 to 1854 was a remarkable one in many ways not least from the medical point of view. The ship left England in January 1850 with a complement of 66 carefully selected officers and men. She reached the Sandwich Islands (Hawaii) six months later having only been at anchor one day in the Straits of Magellan where a few days supply of fresh meat was obtained. A supply of fresh vegetables was taken on board in Hawaii but the ship was only in harbour for four days. Five invalids were exchanged with men from HMS *Swift*. The *Investigator* sailed for Bering Strait via the Aleutians arriving before the *Enterprise* which had departed earlier from Hawaii. Captain McClure took the decision to press on without waiting for his senior officer upon his own responsibility with the urgent mission of searching for Franklin. Rounding Point Barrow the ship was the first to sail the north coast of what was then Russian America (Alaska). No sign of the lost expedition was seen but some notable geographical discoveries were made. These included Prince of Wales Strait (where the *Investigator* wintered 1850–51) which links what is now known as Parry Channel with the waters north of the American mainland thus completing a North West passage. During the second navigation season in 1851 the *Investigator* rounded Banks Island and found winter quarters in the Bay of Mercy on its north coast thus discovering another North West passage. A

second (1851–52) and third (1852–53) winter were passed here since the ice never allowed the ship to get out. She was finally abandoned in the early spring of 1853 when the "Investigators" on short rations and attacked by scurvy walked or tottered across the heavy ice of what is now called McClure Strait to join HMS *Resolute* off Melville Island. This ship had come from England via the Atlantic and formed part of a squadron under Sir Edward Belcher which was searching for Franklin 1852–54. Most of these vessels were in their turn abandoned in the ice, but after many vicissitudes the "Investigators" arrived home at last. The senior surgeon, Dr Armstrong, has attributed their immunity from scurvy "for a longer time than has ever been known before in the Polar Sea" to the daily ounce of lemon juice which was drunk by the men in the presence of an officer.[8] He also attributed their good health to this and to the musk oxen, reindeer, hares and other game that supplemented their diet of salt meat and canned food.

Interesting from a medical point of view was the experiment made by Armstrong at the request of Sir William Burnett, Medical Director General of the Navy, as to the relative merits of the lemon juice prepared by adding a tenth part of brandy and the other merely by boiling. The juice was kept in 64 ounce bottles carefully corked and sealed, with a stratum of olive oil on the surface. Half the crew took one type and half the other. Little difference was detected by Armstrong, who in the same treatise described the victualling and ventilation of the *Investigator*, but to a lesser extent. The Arctic voyages of the 19th century have been well discussed by Lloyd and Coulter.[9]

HENRY PIERS' DIARY

We must now turn to the actual diary of Henry Piers, Assistant Surgeon in HMS *Investigator*. This is a quarto-sized canvas covered volume, held in the collections of the National Maritime Museum, Greenwich (see note 1), which runs from his appointment (for which he volunteered) in December 1849 to 31 March 1852, and thus does not cover the whole voyage. It is written in ink and comprises 366 pages. It is a personal record, concerned with all aspects of the expedition, not merely its medical details, although it is to this latter aspect we are now interested.

On 22 June 1850, when nearing the Sandwich Islands (Hawaii) after six months at sea, Piers recorded that several men had been admitted to the Sick List with "assitude, debility and the gums sore, spongy, bleeding and receding from the teeth. They mostly belong to the Port Watch and have been taking the boiled Lime Juice which Sir Gilbert Blane considered as inferior to that prepared without boiling." This was contrary to Armstrong's eventual conclusion that there was no perceptible difference in effect between the two preparations.

The work of navigating through ice along the northern coast of America was often extremely arduous for the men, when obliged in calm weather to tow or warp the ship. The officers then would lend a hand with the capstan and with warping. The men would sometimes be almost powerless for a short time after spells of this activity and then the usual quantity of rum would be added to the lime juice and extra food provided for supper. When the *Investigator* was in a perilous position on 24 September 1850 between heavy ice flows, Captain McClure "ordered everything—provisions, housing, clothing, boats, medicines—to be instantly prepared and got on deck for going on shore." Fortunately the ship withstood the pressure and the emergency subsided. Piers remarked at this time (26 September 1850) on the improvement in the men's health since nearing the Sandwich Islands and I think now no body of men could be in better condition for conducting the service we are engaged in." He had a high opinion of the men and continued: "In a moral sense I think our men are superior to what are generally met with as a ship's company in the Service". Both officers and men were to need all their physical and moral strength during the later years of the voyage.

THE WINTER OF 1850–51

The ship was housed in for the winter of 1850–51 beset in the newly discovered Prince of Wales Strait. The men were to sleep all night in their hammocks, while the officers were ordered into five watches. Coal was distributed for the warming of the Gun Room etc and to heat a Sylvester's stove to warm the whole ship. A sledging journey of ten days in late October 1850 led by the Captain to the northern end of the Strait showed in Piers' opinion that methods could be improved by the provision of more fuel and the omission of rum. McClure lost his way back to the ship and spent much of the night in the open, walking about and then sleeping in a snow bank. Piers commented on this (31 October 1850): "He is not physically strong but possesses considerable spirit which no doubt did him good service on this gloomy

occasion and I dare say contributed under Providence to his preservation" However the spirits of all were uplifted by the Captain's public announcement on 2 November 1850 to the ship's company of the result of the sledge journey—the discovery of "what England had been endeavouring to do the last three or four hundred years—viz—the North West Passage" McClure was confined to his cot for a month after the journey but Piers does not make clear the nature of his indisposition which neither Osborn nor Armstrong mention However the Moravian interpreter to the Eskimos Johann Miertsching, described[16] the captain as returning more like a corpse than a living man and wrote of his body on 16 November as being covered in sores By 13 December, he reported McClure as "fairly well recovered" and taking an hour's walk on deck each day

The weeks of continual darkness passed rapidly and comfortably found Piers "Long walks could not be undertaken but it was possible to exercise on beaten tracks round the ship or under the housing on deck in bad weather Football and rounders were played and the visits of a solitary raven welcomed On 9 December 1850 Piers recorded that the ship's company continued exceedingly healthy with seldom more than one man (suffering from an "abscess of the liver and dysentery contracted in the Indian Seas two years or more ago) on the Sick List He praised the excellent diet and the insistence on regular exercise in keeping up the men's vigour In the evening a school was "open to any who wished to learn writing, arithmetic or navigation" After that the men would "amuse themselves variously in the messes or in dancing and singing near the main hatchway" He also found the warm clothing very good His own day as detailed on 17 December 1850 went as follows he would rise soon after 7 and breakfasted at 8 visiting the sick afterwards walked on the ice till 11 time since at 11 30 dinner at 12 pm Then on the ice again 4 to 5 30 visiting the sick at 5 30 followed by tea at 6 then walking again for one and a half hours. The rest of the evening he would spend writing or amusing himself turning in at 11 pm

He found the winter passed rapidly and not unprofitably He noted that eyes adapted to the darkness and bodies with some additional clothing, to the bitter temperatures sometimes as low as minus 50 F more easily on calm clear days On 15 January 1851 the anniversary of their departure from England at the end of an eventful year Piers speculated on the one to come He recorded the ship's company as being in excellent health and spirits bar Charles Steele (with his chronic bowel infection) and James Williams (in a critical state with severe inflammation of the pericardium and left pleura) The brief Arctic summer of 1851 saw the *Investigator* make an extraordinary voyage along the west coast of Banks Island at the edge of the very heavy became ice and east into what was later called McClure Strait at the eastern end of Parry Channel where the heavy floes greatly endangered the ship Everyone had to be ready to leave the *Investigator* at a moment's notice An example of the sort of strain suffered by both ship an men occurs in Piers' diary for 14 August 1851

> At about 9 30 or 9 45 our stern-post took it with a slow steady and powerful pressure the whole ship trembled under the struggle for mastery and never with us before has her strength been so thoroughly tested the mizzen mast was seen to shake the bells rung or chattered, the Boatswain who was confined to his bed dressed himself and came on deck, for he told me afterwards he could not remain below as he expected every minute a visitor to his cabin Biggs too a Marine and Captain's steward thinking the cabin was coming in seized the captain's packed carpet bag and ran to the ladder with it"

THE SECOND WINTER

A safe harbour for their second winter (1851–52) was eventually found on the north coast of Banks Island in the Bay of Mercy and hope of making the passage eastwards to England in 1851 was abandoned They had as yet found no traces of Sir John Franklin nor had any news of their consort the *Enterprise*

> With regard to ourselves and our prospects for the winter" [wrote Piers on 25 September 1851] our ship's company is remarkably healthy there being only four on the sick list and none of them is seriously ill we have not as yet had a case of scurvy and only one chest infection—inflammatory We have secure and good winter quarters a comfortable ship over our heads good provisions (though unfortunately we are going six upon four (a one reduced food allowance) on the 1st Oct., which will not tend to strengthen or fatten us in this cold hungry region plenty of warm clothing and considering all things good spirits

Fortunately game in the form of musk oxen reindeer and hares supplemented the reduced diet during the winter months 1851–52 however one of the able seamen Charles Anderson a Canadian born negro and a remarkable well developed and powerful man nearly died of exposure in early February 1852 during a hunting trip and survived through the efforts of the Serjeant of Marines John Woon.

Piers diary ends on 29 March 1852 towards the end of the *Investigator's* second winter in the high Arctic His sketch of the "common routine of one of these gloomy winter days has been quoted in an earlier paper [1] We have to turn to other accounts for the medical history of the second half of this voyage which is interesting not only for itself but for the resemblance it must bear to that of the lost Franklin expedition of 1845–48 The difference was all but five of the 'Investigators' survived

It must be said however that the Mate (Lieutenant Wynniatt) and one of the men (Bradbury) suffered from madness.[1] Wynniatt dangerously so from the early winter of 1852 This volume of Piers diary ended before things got really grim aboard the *Investigator* from hunger scurvy and depression I have not ascertained whether he began another



Fig 3 Ice-up scene on HMS *Investigator* August 20th 1851 Engraved on the sketch by Lieutenant S Gurney Cresswell published in 1854



Fig 4 Sledging over hummock ice April 1853 Engraved from the sketch by Lieutenant S Gurney Cresswell published in 1854



Fig 2 Captain Sir Robert McClure Engraved from the portrait by Stephen Pearce and published in 1856

ACKNOWLEDGEMENTS

I wish to thank the Trustees of the National Maritime Museum for permission to quote from Piers journal and the Director of the Royal Geographical Society for permission to reproduce the map of the North West Passage region as known in 1845

I am also grateful to my former colleague at Greenwich Mr A W H Pearsall ISO MA for his generous investigation of Piers medical career in the Public Record Office Kew

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AUTHOR S NOTES

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2 *Reference 4* Piers was promoted Surgeon on 3 March 1854 (later back-dated to 26 October 1850) and promoted Staff Surgeon on 19 February 1863 He retired on 12 June 1873 and was allowed to assume the honorary rank of Deputy Inspector General (ie having had at least 25 years service and of distinction) Sources Adm 196/8 Adm 104/29 Adm 104/23 f 153 Adm 104/17 f 317 Adm 104/28 f 31
3 *Reference 8* This includes letter from Dr Armstrong and Captain McClure who call the lemon juice "lime juice

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Early return to work following highly selective vagotomy

D N Tulloch and E P Dewar

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Summary

In the Royal Navy after surgery the time that servicemen spend away from work and the level of duty to which they return are decisions made by the surgeon and the general practitioner

In a prospective study we have thus been able to assess the acceptability of return to full duty at decreasing intervals after highly selected vagotomy (HSV)

Seventy-eight service men who underwent HSV for duodenal ulcer were studied in three periods, 1978–1980 1981–1982 1983–1986 each with a shorter interval to return to duty

There were no differences in the rates of ulcer recurrence incisional hernia or ability to perform full duties

After HSV the mean time to return to full duties for each group was 29 3 16 4 and 4 2 weeks respectively Every patient returned to full duties at 28 days was able to perform any assigned task whether at sea or ashore

INTRODUCTION

In the armed forces there is a requirement that active servicemen are returned to full duty as soon as is practicable after hospitalisation However the practitioners wish to ensure that their patients are not subjected to physical demands that may be detrimental to optimum recovery As a result the timing of return to duty is the responsibility of the consultant in charge of the case Utilising this policy a prospective comparison of varying times to return to full duty after highly selective vagotomy (HSV) has been studied

PATIENTS AND METHODS

All servicemen undergoing HSV for duodenal ulcer (DU) in RNH Haslar between 1978 and 1986 were entered into the study The patients were grouped according to three time periods 1978–1980 1981–1982 1983 1986 groups A, B and C respectively All patients underwent routine HSV according to the method described by Johnston and Wilkinson[1] after endoscopic confirmation of the diagnosis and preoperative acid studies

Group A were given 6 weeks convalescence followed by a period of medical downgrading such that they were unable to go to sea or to an appointment outside the UK for a period of 6 months this having been postoperative policy in the preceding 10 years when truncal vagotomy and drainage was the operation of choice

Group B were given only 4 weeks convalescence and were downgraded for only 3 months with the same restrictions as Group A

Group C were given just 3 weeks convalescence and were then returned to full duty and were thus available for seagoing or any other duty

Follow up was by personal interview and scrutiny of the general practitioner's follow up referral notes in the gastric follow up clinic at 6 weeks 6 months 1 year and annually thereafter Postoperative acid studies were performed at 6 months

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Table I Complications following HSV in servicemen

Complication	Group A(n=15)	B(n=19)	C(n=44)	A+B+C
Ulcer recurrence	2 (13 3%)	1 (5 2%)	0	3 (3 8%)
Dumping	0	1 (5 2%)	1 (2 3%)	2 (2 5%)
Diarrhoea	0	0	0	0
Incisional hernia	1 (6 6%)	0	3 (6 8%)	4 (5 1%)

RESULTS

Seventy eight patients with a mean age of 35 1 years (range 21 53 years) were entered into the study Nearly one third (30 7%) had suffered a previous perforation or significant haemorrhage from their DU The three groups were well matched for age and the incidence of previous complications. Mean follow up was 43 7 months (range 15-122 months)

Table I shows the results of each group with respect to ulcer recurrence dumping, diarrhoea and incisional hernia No patient developed any other significant post gastric surgery complication (eg nausea vomiting anaemia, weight loss dysphagia heartburn or satiety)

There are minimal differences between the groups but none that can be attributed to the earlier return to work Two of the three ulcer recurrences occurred in patients taking non steroidal anti inflammatory drugs for unrelated pathology All the recurrences have since healed on H_2 receptor antagonist therapy and are effectively Visick Grade 1 or 2 The Visick gradings for all patients are shown in *Table* II

Table II Visick grading following HSV in serviceman

Grade	Number	%
V1	49	62 9
V2	26	33 3
V3	0	0
V4	3	3 8

The personal interview and scrutiny of referral letter for follow up demonstrated without doubt that on no occasion had any of the patients from any of the groups been unable to carry out any duties even when returned to sea In some cases this included service during the Falkland's conflict, a time of not inconsiderable stress and heavy work

The mean time to return to full duties was 29 3 weeks for Group A 16 4 weeks for Group B and 4 2 weeks for Group C A considerable saving in time being achieved by early return to duty without detriment to the patient

Cost saving

Accepting from the above data that no adverse outcome results regardless of the period of convalescence then an arithmetical assessment of time saved can be made To this end we have defined the period when a serviceman is unable to carry out his full duties (and therefore unable to fulfil his war role) as the 'lost personnel effective period' This covers the time when he was in hospital on convalescence and in a downgraded medical category

The calculation is

$$\frac{n \times \text{lost personnel effective period}}{365} = \text{man years}$$

where n is the number in each group and the lost personnel effective period is the mean time to return to full duty for the group in days (*Table* III) In this study the overall lost personnel effective period was 17 8 man years

If over the period of the study all had been treated as for Group A then the lost personnel effective period would have been 43 8 man years If all had been treated as for Group B then the lost personnel effective period would have been 24 5 man years

If all had been treated as for Group C the lost personnel effective period would have been 6 3 man years

By shortening the time away from duty from that in Group A to that in Group B initially and then to that in Group C the actual saving which did occur is calculated as 25 9 man years

Table III Time spent nnfit for full dnty following HSV

	Gronp		
	A(n=15)	B(n=19)	C(n=44)
Mean time per patient in days	205 1	114 9	29 4
Lost personnel effective period in man years	8 4	5 9	3 5

in the six years 1981–1986 compared with the policy in existence prior to the study

DISCUSSION

In civilian practice the decision regarding the time to return to work is much more arbitrary and tends to be a joint one between the patient the general practitioner and to a lesser extent the consultant A previous study[2] has shown that without firm advice to the patient the time to return to work can be extremely variable and errs on the side of undue caution

We have demonstrated that in our hands HSV is a safe effective treatment for DU and that an aggressive policy in returning patients to work early has not been detrimental to the results of the surgery The numbers in each group with complications are so small that statistics cannot be applied but undoubtedly the recurrence rate overall is well below the oft quoted figures and the incidence of incisional hernia is no greater than would be expected and only two of these required repairing

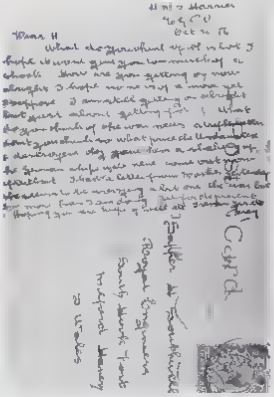
It is accepted that there is no quantitative evaluation of performance after surgery but no patient was referred back because of inability to work properly and at all regular reviews specific questions relating to this aspect were asked It could be argued that some of these patients would now be treated medically but it must be remembered that nearly one-third had had a life threatening complication of the DU disease and that there is a significant recurrent ulceration rate while on medical treatment All these patients had had persistent or recurring DU disease and in such cases it is thus even more relevant to realise what a good option surgery can be with so few side-effects and no longer the need to be off work for a long period

In industry and commerce, as well as in the forces significant cost savings could be achieved by ensuring that patients are advised most strongly as to when they can return to work

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The above postcard which is in the possession of the Editorial Secretary Mrs Jill Southwell depicts her late father in law Sick Berth Petty Officer Percy John Southwell (*seated*) and an unidentified shipmate The card was sent shortly after the outbreak of the First World War from HMS *Harrier* to Petty Officer Southwell's younger brother Sapper Horace Southwell serving with the Royal Engineers at Milford Haven and gives a few personal thoughts on the then current situation

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"Hurricane Gilbert"

M M Parrish

INTRODUCTION

It was HMS *Active's* last night in Maracaibo. The majority of the ship's company was ashore sampling the local nightlife of Venezuela a country whose financial plight with the IMF endeared itself to us because of its excellent rates of exchange. As we walked back over the brow in the small hours of the morning, the Quartermaster greeted us.

"Morning Sirs, heard about Hurricane Gilbert? Most of the Caribbean's been wiped out and we're off to save them and get a medal. The Captain wants us to leave at dawn but there's no one back on board. Have you seen the Jimmy ashore?"

The West Indies Guardship (WIGS) has a number of tasks. It is the Belize Guardship it flies the flag in British and ex-British dependencies it assists the US Coastguard in anti-drug operations. It is also on station to provide disaster relief in an area noted for hurricanes, and these have been particularly bad in the last two years. On 10 September 1988 tropical storm Gilbert which had formed out in the Atlantic had reached sufficient strength to be declared a hurricane. Over the next few days, it tracked in a west north westerly direction across the Caribbean passing directly over Jamaica before blowing itself out in Mexico on the 18th (*see Fig. 1*). At its peak the winds reached 160 miles an hour and the central pressure fell to 890.2 millibars the lowest ever recorded. The hurricane left a vicious trail of destruction across the Caribbean and went down in the record books as the worst ever until Hurricane Hugo surpassed it last year.

PREPARATIONS BEFORE ARRIVAL

Thirty six hours later *Active* was steaming up and down an imaginary line in the ocean off the island of Grand Cayman a British dependency apparently badly hit by Gilbert. Even though we had never been less than 300 miles away from the hurricane the seas had been most unpleasant all the way from South America but the time had allowed us to think about the problems we were likely to face and prepare for them. Portland and BOST must have some advantages and one of them is the DISTEX serial it may have been an annoying day but it was to prove useful in the long run and gave us a good framework to build upon.

We inoculated the entire ship's company against cholera as early as possible so that any after effects had worn off and the available maps of the area many held on microfiche were copied and enlarged. Our hurricane stores were sorted out as best as possible in the high seas with any final organisation taking place as soon as the ship was alongside. We compiled a list of specialist civilian skills and were surprised by the hidden talents among the ship's company there were HGV JCB crane and forklift truck drivers, roofers masons and scaffolders and virtually everyone claimed expertise in operating a chain saw.

GRAND CAYMAN

As we looked at the little island of Grand Cayman with its beaches covered in storm debris we wondered how bad the damage was. A voice came over the VHF radio it was the

Surgeon Lieutenant Parrish is a Senior House Officer in Obstetrics and Gynaecology at St George's Hospital Tooting.



Fig 1

manager of the Grand Cayman Yacht Club asking if we could look for a yacht which had broken her moorings and if the Senior Rates could come to a party that evening, the theme being what you were wearing when the hurricane struck. Things obviously weren't too bad the storm having passed 30 miles to the south of an island which is affluent and therefore has well constructed buildings able to survive high winds. Apart from clearing up fallen trees and using the satellite link to contact the UK there was little for us to do. The ship then diverted to Jamaica arriving at midday the next day.

JAMAICA

The situation in Jamaica was much worse, the island having been devastated by its first hurricane for 37 years. The scene was one of chaos and confusion with a large proportion of the shanty type dwellings destroyed and many other buildings suffering damaged roofs. Power lines were down, trees uprooted and crops flattened. Fortunately despite torrential rain most of the flooding quickly receded and was not a problem.

The ship made early radio contact with the Office of Disaster Preparedness (OPD) an organisation specifically set up for just this eventuality. *Active* was able to berth alongside in Kingston harbour and the remainder of the day was spent in meetings with the OPD and other government bodies to decide what help we could give to the islanders. During the next five days the ship sent between 110 and 120 personnel ashore in a variety of working parties. We concentrated on work in the Kingston area alone as Jamaica is a large island and we did not want to split our resources any more than necessary.

Reroofing and restoration of services in four hospitals

Virtually every roof in Jamaica is of a wooden construction covered by metal sheet. Gilbert



Fig 3



Fig 4

left most of the wooden sub structures intact but removed a great deal of the metal sheet The four main hospitals in the Kingston area needed urgent repairs to their roofs as well as general tree clearance mechanical and electrical repair work This was achieved with 200 man days of effort by far the biggest task undertaken It was not without its problems as the WIGS disaster relief stores did not include zinc sheeting procuring this valuable commodity took time and ingenuity as it was in demand by the whole population

Field kitchen

Half a million Jamaicans were made homeless by Hurricane Gilbert, and those in Kingston were housed in 60 shelters holding between 150 and 400 people A field kitchen was set up at a central distribution point the Red Cross headquarters and food was taken from there to the shelters A basic stew was cooked on board the ship each night and taken to the field kitchen the next day where it was warmed and added to rice cooked on the spot The mixture was then packed into individual portion cardboard boxes acquired from the local delicatessen and taken by vehicle to the shelters

Cooking could become a hazardous task and the field kitchen was continually protected by armed guards as were the distribution teams In several of the more desperate ghettoes people had not eaten for three days and were not in the best of moods

The field kitchen produced about 2000 meals a day with little difficulty the only limiting factor being the supply of meat and rice Fortunately this is not a problem for the average resourceful sailor and supplies would always arrive from somewhere Standing on the upper deck of the ship in the evening it was not unusual to see a freshly slaughtered cow carcass disappearing down to the galley with the Supply Officer denying all knowledge of its purchase

Medical support

Surprisingly there were no major medical problems directly attributable to the hurricane itself Sixteen people lost their lives but there were few serious injuries A potentially dangerous situation was the half million homeless living in shelters These had no water or electricity and poor hygiene Thirty per cent of the homeless were children under the age of 10 and the potential for disease and infection to spread with serious results was high Medical support teams were assigned to the Red Cross each day and travelled round the shelters, using drugs and dressings from the hurricane supplies carried by *Active* The main task was preventative

medicine stopping the spread of infection by vaccinating as many people as possible against cholera tetanus and typhoid The main conditions seen were diarrhoea and dehydration in children and lacerations from the zinc sheet roofing It was an excellent opportunity to train the First Aid teams who soon became proficient in giving injections and treating wounds

The medical team flew up into the mountains to some of the remote communities to deliver medical supplies and hold clinics as well as visiting most of Kingston s modern health centres which had been built with foreign aid. Despite no damage they were closed and their brand new generators had no fuel in the tanks A sign on one of the doors read

"No knives guns ice picks or any other form of weapon are allowed in this clinic All weapons must be left with Security Failure to comply will result in action that will be taken by the police"





It these centres had been open and staffed they would have taken an enormous load off the Red Cross in the first few days after the hurricane They were closed because many Jamaicans were more concerned with securing their own homes and were also in a state of shock.

Electrical repairs

Gilbert blew down power lines and disrupted electrical supply to many establishments A team of 20 repaired damaged lines under the supervision of only one power worker no electrical skills were required and the skill of climbing a telegraph pole was quickly learnt

Harbour survey

Many of the beacons marking the main ship channel had been damaged or destroyed and there was the possibility that spoil from a dredging operation had been swept into the channel The main channel was surveyed from a ship s boat and a diver marked the remains of the beacons

Aviation

The Lynx was one of the ship s most valuable assets and flew for 24 hours in five days with all routine maintenance being done at night It carried out personnel transfers stores sorties and 180 miles of low level power line survey to determine the amount of damage to high tension cables in remote areas before returning with repair teams This was by far the quickest way to survey power lines in inhospitable country and greatly speeded up the work of the electricity company It also appeals to aviators as it involves low level high speed flying it is best to choose a local electrical engineer who does not get airsick and enjoys fairground rides

Control and communications

Keeping these various groups supplied and in touch with each other as well as the Jamaican authorities was a problem. A progress meeting was held onboard *Active* each evening attended by representatives of the ODF. The manpower equipment and transport requirements for the next day were decided and a programme drawa up.

Our HQ was the bridge from where communications could be monitored, maps displayed and transport coordinated. Each shore team had a radio with which they could theoretically communicate with the ship and with each other. Communications with the OPD who used a frequency not available on our radios could only be achieved by putting a man at OPD HQ with one of our radios to pass messages on.

LESSONS LEARNED

One of the advantages of being on the spot was our ability to provide aid in the first few days after the hurricane before the large western relief organisations had swung into action. We learnt a number of lessons during our five days in Jamaica.

Warning

The hurricane warning system in the Caribbean is now sophisticated, accurate and timely, and it generally ensures that the islands are better prepared for a natural disaster. In addition most islands have a hurricane committee or disaster organisation to deal with emergencies and a combination of these has meant that the scale of hurricane disaster and particularly loss of life has been reduced. The human element however should not be forgotten. Jamaica had been threatened by major hurricanes virtually every year for the last 15 years but they had changed course and missed the island at the last minute. The population became complacent and many ignored the warnings of Gilbert thinking that it too would miss the island.

Preparation

The Portland DISTEX serial provides good training for the real thing. Obviously every disaster is different but the basic organisation is the same and *Active* drew heavily on the recommendations preached by FOST and suggested a number of changes to the serial in the light of our experience.

Liaison with civil authorities

Close liaison with the civil authorities is essential. Hurricane committees and disaster organisations are generally well organised and can provide local information and support. They do not however understand the limitations of a small ship's company and may ask for the impossible. Our nightly meeting to decide the priorities for the next day worked well and any urgent requests during the day were channelled through one person.

Shock factor

The shock factor was particularly evident in the first few days. It appeared in various forms, a lack of self help, a lack of support to shore working parties, businesses and shops remaining closed when food and other materials were required, medical centres remaining closed when the hospitals were overloaded with minor complaints, empty streets and a general lack of urgency. After some initial misgivings by the local population our working parties were greeted eagerly and helped to motivate the local people.

Civil disorder

Civil disorder followed the initial shock after three or four days the people in some of the outlying districts became extremely hungry as they had had no food. They were desperate and dangerous and some of the food delivery teams were threatened even though they were accompanied by armed guards. The unpredictable nature of desperate people should never be overlooked.

Royal Fleet Auxiliary support

Active was accompanied by RFA *Oakleaf* throughout the time in Jamaica and proved the value of RFA support. A tanker is able to supply a number of things:

a. A ready supply of good fuel which means you can get to the area quickly and stay there for longer.
b. Fresh water. This is a potential lifesaver as local supplies can become contaminated and harbour water is often unsuitable for evaporation—it certainly was in Jamaica and we were grateful for the 1000 tons of water carried by *Oakleaf*.
c. Another source of technical advice and manpower. *Oakleaf* undertook independent repair projects in Kingston.

d. Extra stores. Not all the Disaster Relief stores can easily be carried by the warship and the RFA provides extra space for the bigger items.

Stores

The scale of disaster relief stores was adequate as long as some items could be supplemented from stocks ashore. Medical stores were good with the exception of oral rehydration powder and needles and syringes for the vaccines supplied. Roofing damage was the biggest problem in Jamaica and there was an acute shortage of any materials such as zinc and PVC sheeting and nails. Acquiring these became a major task and in future we recommended that stocks of these materials are carried in the RFA.

Communications

Reliable communications are the key to success in disaster relief. They are often difficult to achieve and can hamper operations. Satellite communications would have vastly improved contact with the UK, especially in the early stages when reception was atrocious on HF because of the weather. Portable communications were disappointing and seriously affected the ability of working parties to talk to the ship and vice versa. It became a daily battle to contact each other and the OPD if vital stores or transport were needed.

CONCLUSION

HMS *Active* and RFA *Oakleaf* were able to provide help to the people of Jamaica in the first few days after Hurricane Gilbert before the large relief organisations could swing into action by repairing roofs and power lines, providing food and medical assistance, transporting stores by air and surveying damaged waterways.

This was the advantage of being on the spot and prepared. It was notable that the UK was the only country with a visible presence on the island immediately after the disaster. The value of sailors working ashore is immense in so many ways, not least in the enormous goodwill they create.

ACKNOWLEDGEMENT

The author acknowledges the help of the Fleet Photographic Unit, in particular L/Phot A. Collier who took the photographs.

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The Boat People of Vietnam. Rescue on the South China Sea

T J Hayes, D Thomas and E P Dewar

Abstract

Poor economic conditions in Vietnam have encouraged large numbers of people seeking a better life in the West to join the flow of political refugees leaving the country as "boat people". We report the events surrounding one such group of people who were rescued from the South China Sea by the Outback 88 Task Group.

INTRODUCTION

LARGE numbers of Vietnamese fled political persecution in the Seventies and early Eighties as "boat people". Now poor economic conditions in Vietnam have led to a new flood of boat people... this time fleeing poverty and seeking better prospects in the West. Families or groups of mainly young people will pay what is to them a fortune to become part of the human cargo of a decrepit steamer. Alternatively they will set forth in small open boats with little in the way of water and provisions, no navigational expertise, exposed to the elements at risk of piracy and at the mercy of the sea.

Some succeed but many perish the result of exposure, drowning or at the hands of the infamous pirates of the region. Those that succeed among the "boat people" become part of the increasing problem in Singapore and Hong Kong. When they do arrive most are suffering from the results of exposure and malnutrition and require medical assistance.

REPORT

During the Outback 88 deployment to the Far East and Australia HMS *Ark Royal* in company with five other ships including HMS *Edinburgh* and RFA *Olwen* spent time exercising in the South China Sea.

On 29 August a helicopter from *Ark Royal* sighted a small open boat without mast, sails or other form of power drifting under the blazing tropical sun with several apparently exhausted people on board. HMS *Edinburgh* being the closest ship proceeded to investigate. On closing the small vessel she despatched her sea boat to go alongside.

The scene that greeted the crew was of an unseaworthy boat with no means of propulsion containing 19 bedraggled people, some adults, some children and one infant, in varying states of health.

Not unnaturally the decision was made on humanitarian grounds to rescue these unfortunates from their otherwise inevitable fate and 18 refugees were transferred to HMS *Edinburgh*. The nineteenth was found to be dead in the bottom of the boat. He was not the only one of their company to have died since they had set out, the others, the actual number was never revealed, had been cast to the deep as they died. The body was buried at sea and the boat scuttled.

A head count once on board *Edinburgh* showed that the survivors comprised eight adult males, three adult females, three teenagers, three young children and one infant. The latter, a boy was just two weeks old having been born in the boat at sea, delivered by his mother's friends. Manifestly he was the

Medical Assistant T J Hayes was serving in HMS *Ark Royal*. Surgeon Commander Dewar was formerly her Principal Medical Officer and is now appointed to RNH Plymouth. Dr Dalyn Thomas was Senior Medical Officer RFA *Olwen*.

healthiest of them all having been fed, albeit meagrely from the breast

It transpired that the refugees had put to sea in their small boat from My Tho south of Ho Chi Minh (Saigon) on 27 July and had thus spent 34 days at sea exposed to the elements At some stage a storm had broken the mast and carried away the sail They had not eaten for at least 10 days having exhausted their supply of food but they had managed to eke out their meagre supply of water by rationing There was virtually none left by 29 August

Consequently the main problems were weight loss and weakness as a result of dehydration and malnutrition These aside those who had survived being relatively young, had not developed any major medical complications The Medical Officer and POMA in *Edinburgh* thoroughly examined the refugees and set about the process of rehabilitating them Over the next 48 hours their state of dehydration was carefully corrected and the malnutrition countered by the provision of a proper diet Some skin lesions the result of the exposure required local treatment and nursing care All survived and began to make good progress

After 48 hours for logistical and operational reasons all 18 were transferred to RFA *Olwen* which was due to proceed to Singapore and could therefore land the refugees there The Medical Officer in *Olwen*, being single-handed requested support from the Medical Department of *Ark Royal* One of the authors (TJH) was therefore loaned to *Olwen* to assist in caring for the refugees until their disembarkation

During the following seven days some minor ear infections and further skin problems required medical treatment but from that point of view the patients remained remarkably well considering their ordeal Attention was focused on diet and fluid replacement with excellent response in terms of weight gain and recovery of bodily strength

The constant attention not only from a medical viewpoint but also by several of the members of the crew of *Olwen* combined with the excellent initial care in *Edinburgh* ensured that all 18 of the refugees were landed in a healthy condition in Singapore

DISCUSSION

The situation that arose on the 29 August in the South China Sea highlights the diversity of problems with which the medical departments of any RN or RFA ship may be required to deal. The successful outcome was a result not only of the adaptability of those concerned including having to deal with a two week old baby but also the support provided by the whole ships companies Clothing money sweets and toys were donated to the refugees in a spontaneous response to try to give them a new start in life The emotive reaction to the predicament of these people is best demonstrated by reproducing the thoughts of two of the authors as they recorded them in writing at the time

M A Hughes wrote

When they arrived on board RFA *Olwen* they (the refugees) were all very emotional as they had grown very attached to HMS *Edinburgh* even in such a short time The crew of *Edinburgh* had after all saved their lives

A few were still very weak and all looked very tired During the days I spent with them I noticed a big change in them all They began to put on weight and got stronger day by day They were all very happy and contented They were all liked by the *Olwen's* crew who it seemed had adopted them as their family "One of the crew could speak Cantonese and we discovered that their occupations ranged from land surveyors to students

Doctor Dulyn Thomas wrote

We welcomed 18 Vietnamese refugees on 31 August They arrived in three lots by boat from HMS *Edinburgh* accompanied by Surgeon Lieutenant Hughes It was a heart rending scene.

"We have accommodated them in the Hospital in the Cadet classroom and in a large Cadet cabin All are comfortably housed They are well cared for the ship's crew is most anxious to be supportive

One observes interesting scenes our 18 stone Chief Cook on his knees feeding a frail almost hydrocephalic child like a mother hen feeding a hungry chick Our steward ALMOST breast feeding the tiny baby born on the boat!

"I have become the repository for money tee shirts trousers chocolate talcum powder etc We received this afternoon a marvellous collection of toys from *Ark Royal* made by the chaps and observed the expressions of joy on young faces when given teddy bear skipping rope hobby horse and trolley And of course the crib for the baby Thank them all

I am compiling the history from Welsh(?) → English → Cantonese → Vietnamese →

English → Welsh we manage surprisingly well. We live in a strange old world don't we?"

ACKNOWLEDGEMENT

The authors acknowledge the invaluable contribution of HMS *Edinburgh's* ship's company in particular Surgeon Lieutenant Paul Hughes and POMA Martin Baggley

POST SCRIPT

MA (now LMA) Tim Hayes was commended for his efforts by the Master of RFA *Olwen* and was subsequently awarded a Herbert Lott Trust Fund Prize



Surgeon Captain A M Hazell Royal Navy (on right) taking over Medical Charge of Royal Naval Hospital Gibraltar from Surgeon Captain M J Mann Royal Navy on 2 November 1989

Abstract

Evaluation of simple periodontal screening technique currently used in the UK Armed Forces

K A Eaton A J Woodman. Evaluation of simple periodontal screening technique currently used in the UK armed forces. *Community Dent Oral Epidemiol* 1989 **17** 190–5

The need to prioritise resources for periodontal care within the UK Armed Forces has led to the development and introduction of a simple periodontal screening technique, the Periodontal Index for Treatment (PIT) based upon the clinical assessment of six teeth (all first molars and the maxillary right and mandibular left central incisors) with a specially designed periodontal probe (the PIT probe) and the use of bitewing radiography. This paper describes the evaluation of the technique. This was carried out by examining 406 subjects aged from 16 to 64 yr in four groups. All subjects received a full mouth periodontal assessment performed by one of two periodontists with standardised bitewing radiography of their premolar and first and second molars. They were then categorised as periodontally healthy (PIT 0) with gingivitis but no pocketing exceeding 4 mm (PIT 1) with pocketing 4–5 mm (PIT 2) or with 6 mm+ pocketing (PIT 3). The subjects were then examined and categorised by one of 32 General Dental Practitioners using the PIT technique upon the six test teeth and subsequently viewing the bitewing radiographs. The results of the two types of examination with and without bitewing radiographic evidence were tested for sensitivity and specificity to detect pocketing in excess of 4 mm and/or bone loss. The results showed that when used without bitewings as an adjunct the PIT technique showed a specificity of 95–100% but a low sensitivity in three groups (36% 52% and 59%) and of 94% in the fourth group who had in fact been referred for periodontal treatment. When bitewing radiographs were used as an adjunct to periodontal probing the PIT technique showed a specificity of 100% in each group and a sensitivity of 89–100% when screening for pockets and/or bone loss. It was concluded that in the subjects studied the PIT technique when used in conjunction with bitewing radiography provided simple rapid and reliable periodontal screening.

BOOK REVIEWS

Labat s Regional Anaesthesia Techniques and Clinical Applications Fourth edition Ed John Adriani MD Pp 728 Waltren H Green St Louis Missouri 1985 Distributed by Gazelle Book Services (Lancaster) £53 75

This is one of the classin anaesthetin texts first published in 1922 As such it is of considerable historical importance to those with an interest in regional anaesthesia The original descriptions of specific blocks and the accompanying illustrations are superb and are still of enormous use in modern clinical practice The function and stated aim of subsequent editions is to delete obsolete items and insert new material of relevance without greatly altering the style of the original text Unfortunately the last two editions by Adriani fail to achieve this objective because the new subject matter lacks necessary detail and in many respects is already outdated

The essential precaution of ensuring venous access before any regional block is not mentioned and the use of intravenous fluids before or during intra or extradural techniques is not discussed Indeed dural puncture is claimed to be the commonest complication of extradural block[1] If this is the case then Adriani cannot have much experience in performing extradurals and with his described technique I would expect crashing hypotension as a very frequent accompaniment The discussion of perdural techniques in obstetrics is totally inadequate and does not draw enough attention to the problem of aorto-caval compression There are several useful blocks that have not been described in an edition that aims to update However the chapter on clinical pharmacology is generally useful although the detail on allergic reactions is insensitive and the use of maximum doses quoted for a healthy adult is considered imprudent The argument against a mg/kg approach is far from convincing

This edition cannot be recommended as the additional material is inadequate The first two editions edited by Labat are still the most desirable for specialists in regional anaesthesia

SQMT

Accident & Emergency Medicine Second Edition Editors William Rutherford Robin Illingworth *et al* Pp 503 Churchill Livingstone 1989 £69 50

Ten years ago the first edition of this book was hailed as the major British text on the subject and once again William Rutherford who many would consider as the father of Accident & Emergency Medicine in the UK, has gathered together a team of well known figures each with a unique contribution to make either as author or editor

This book remains unique in that it considers Accident and Emergency Medicine (A & E) from a British viewpoint albeit taking due account of international opinion All other major textbooks in the sphere are nearly American in origin style and practice

The new edition represents a major revision and expansion of the original while retaining the successful format dealing with clinical matters according to their threat to life The rapid growth of A & E as a specialty is reflected in considerably expanded clinical sections affirming sound practical advice on such diverse topics as cardiopulmonary resuscitation and toothache

In the section on organisation in A & E the chapter on legal matters now offers advice for the litigation conscious as well as suggesting guidance on the law relating to A & E matters A new chapter on social matters highlights increasing awareness and increasing use and abuse of A & E departments for non medical emergencies

The book is designed to provide an authoritative textbook for those who wish to follow a career in the specialty either as doctors or nurses but especially for those studying for the FRCS (A & E) However the contents include more core information which should be understood by any casualty officer including valuable advice on pitfalls in clinical and radiological assessment The style is easy to read promising appeal to a wide spectrum of users

The standard of illustration is unfortunately somewhat variable Much has been made of line drawings many of which are clear and demonstrate the intended points well but some are of much lower

standard The photographs are all monochrome which detracts from the usefulness of such sections as dermatology and some of the photographs retained from the previous edition unfortunately give an undeserved impression of antiquity

The stated aim of the book, is to provide practical succinct and trustworthy advice In this the editors have succeeded Those following the guidance in this book will practise A & E medicine safely This in itself makes the book deserving of a place in every A & E department and commends it to all medical officers who have to deal with significant emergencies far away from colleagues, reassurance or help

ICG

J roy nav med Serv 1990 76 55–57

Letters to the Editor

Sir
CLINICAL MANAGEMENT UPDATE ASTHMA

The above article was read with much interest The retention of asthmatic patients in Medical Category P2 has been viewed with some concern at sea and the clarification contained in the update is welcomed

It is certainly true that asthmatic patients often feel better at sea away from the challenge of pollens and other respiratory irritants Nonetheless the Navy trains for war and there is always the risk that personnel will have to fight in perhaps toxic NBCD environments for extended periods The melancholy possibility exists that some will have to escape in desperate circumstances from smoke filled ships Any tendency to bronchospasm will surely be hazardous and medical categories must logically have this in mind

The article notes that no asthmatic has suffered a significant exacerbation on deployment Is there information that any of these patients have had to fight fires or suffer exposure to the sort of stresses that hostilities would involve? Have asthmatics attended fire fighting courses and if so have they remained free of problems? Reassurance on these aspects would be most welcome

Yours faithfully
D A CUNNINGHAM
Surgeon Commander Royal Navy
Principal Medical Officer
Britannia Royal Naval College

The author was invited to comment on the above

Sir
CLINICAL MANAGEMENT UPDATE ASTHMA

It is implicit in his letter that Surgeon Commander Cunningham considers that no asthmatic should serve at sea Since there is usually little scope for retention in a permanently reduced medical category it follows that virtually all asthmatics should be invalided

There are dangers in this argument Such a policy would result in the annual loss of some 30 men most of whom can perform their duties safely and effectively ashore or afloat. There is the possibility that asthmatics might conceal their condition fearing the consequent loss of career if they sought medical advice It is well recognised that a number of sailors self treat with bronchodilator aerosols obtained from friends or [illegible]-Service medical sources By invaliding [illegible] matics we would abrogate our responsibilities to the individual and to the Service to the individual by failing to do our utmost for him and to the Service by failing to retain the maximum possible number of fit personnel

Much of the practice of Medicine involves risk evaluation Often it is easy to decide for example that the benefits of treatment outweigh the risk of adverse effects In this context we have to balance the risks of sending an asthmatic to sea in a potentially hostile environment against the penalty to the man and the Service if he is invalided In coming to a decision the Chest Physician considers several factors He assesses bronchial hyperresponsiveness, either on clinical grounds or increasingly frequently objectively by challenge testing If bronchial hyperresponsiveness is minimal or is suppressed effectively by treatment it is relatively unlikely that severe asthma symptoms will be precipitated by noxious stimuli such as fire smoke The nature of the man's job is relevant an MEM in a damage control party may cause more concern than a Steward The intelligence and motivation of the man to monitor his asthma and adjust treatment accordingly is also important

Thus each case is judged on its merits Rarely is the decision easy and the Editor of this Journal recently referred to the dilemma faced by Medical Officers in this situation (Reference)

It is encouraging that no patients assessed by a Chest Physician in the manner outlined above have subsequently deteriorated significantly on deployment. Clearly there is no room for complacency and it is for this reason that more objective measures of bronchial hyperresponsiveness are being used to assess the suitability of asthmatics to serve at sea Such tests, including those of unitary significance such as cold and smoke were referred to in the article

Yours faithfully
W M EDMONDSTONE MRCP
Surgeon Commander Royal Navy
Consultant Physician

REFERENCE

Editorial Medical employab lity—The Doctor s D lemma *J roy nav med Serv* 1989 75 63–64

Sir

Further to recent correspondence in this Journal concerning the management of heat illness in Service men and women I should like to make two observations resulting from our experience of these cases at HMS *Raleigh*

Firstly we use the management plan given by Dr Simon Travis in this Journal to good effect Using rapid intravenous infusion plus stripping soaking and fanning as a protocol for all cases we have returned all our patients to duty in a matter of hours It seems to me that while THE priority is the setting up and rapid infusion of normal saline to strip soak and fan is a sensible back up which will help cool the core temperature as the peripheral circulation is restored.

My second observation concerns prevention In 1988 thirty cases of heat illness presented to this Sick Bay between June and December This Summer much the same pattern began to develop with a case or two occurring each week Most had normal temperatures on admission of <40 C but a few were >40°C and one had a temperature of 42°C All cases resulted from the battle run which is a three and a half mile run including two steep hills which recruits do in Week 4 of training This rig for this run had traditionally been boiler suits and DMS boots The aim of the trainers in ordering this rig was to increase physical stress and make recruits aware of what it is like to be stressed in heavy overalls a situation which they might quite soon find themselves in on joining the Fleet Notwithstanding this the medical view was that this rig was entirely inappropriate for physical exercise given the importance of cooling by sweat evaporation from exposed skin surfaces and had to be changed if further cases of heat illness were to be avoided This view prevailed and the rig was changed in June 1989 to denim trousers boots and a short sleeved T shirt Thankfully has been most significant despite a very much hotter summer than 1988 there has not been a single case of heat illness from the battle run since the rig changed This emphasises the importance of clothing in the genesis and prevention of heat illness.

I am Sir
Your obedient Servant
J H GAMP
Surgeon Commander Royal Navy
Principal Medical Officer

REFERENCE

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Dear Sir

We read Lambert and Braithwaite's article about Guillain Barre syndrome (*J roy nav med Serv* 1989;75:113–116) with interest and would like to briefly describe another case with special reference to the role of plasma exchange.

A previously fit 22 year old man was admitted to RNH Haslar on 5 March 1987 with a two day history of swallowing difficulties and hiccoughs together with increasing generalized weakness and paraesthesia of the extremities. He had taken a course of erythromycin prescribed by his general practitioner for a sore throat and fever ten days previously

On examination he was febrile dehydrated and in some distress due to pooling of saliva Although fully orientated he was dysarthric with bilbat dysfunction upper motor neurone facial nerve paresis and weakness of tongue muscles and sternocleidomastoids There was global limb muscular weakness absent knee and ankle reflexes but no sensory abnormalities

A provisional diagnosis of Guillain Barré syndrome was made and a lumbar puncture revealed clear csf with normal glucose but an elevated protein and no cells Subsequently this was shown to be simple Respiratory assessment revealed normal arterial blood gases however the patient was fatigued had difficulty clearing saliva and had a forced vital capacity of 1 1 litres Consequently early ventilatory support in the Intensive Care Unit was instituted

On the day after admission (day 1) he underwent plasma exchange on a Fenwal CS3000 cell separator Two litres of plasma were removed and were replaced by a combination of crystalloid and 4 5% Human Albumin Solution A second procedure on day 2 failed because of inadequate venous access On day 3 a plasma exchange of 2 75 litres was performed via a subclavian line and on day 5 a final plasma exchange of 2 litres was performed making a 5 litres in total

His recovery was complicated by a left lower lobe collapse secondary to mucus plugging This did not respond to physiotherapy and required bronchoscopic removal On day 8 ankle reflexes were regained On day 11 he was taken off the ventilator and on day 13 he established normal oral intake On day 18 he was discharged home.

Six weeks after admission he was well apart from lethargy and poor concentration He returned to work as a manual labourer four months after presentation

Guillain Barré syndrome is an acute demyelinating polyradiculoneuropathy which may have an immunological pathogenesis A number of papers[1–3] have reported evidence of antibodies directed against nerve antigens and the presence of poorly delineated demyelinating serum factors Plasma exchange will remove normal and abnormal plasma components in amounts dependent upon the amount of plasma exchanged and the nature of the component. After one plasma volume is exchanged 36 8% of the original plasma remains Those components confined to the plasma or able to rapidly transfer from the extravascular space are most readily removed

In view of the possible immunological basis of Guillain Barré syndrome plasma exchange has been used since 1978[4] with reports of early uncontrolled[5] and latterly larger randomised[6] trials suggesting a role for plasma exchange early in the disease[7]

A recent paper by Thakaran *et al*[8] reports the experience of one unit where the results of plasma exchange in 16 patients over 30 months were compared to historical controls. They report significant reduction in the median duration of ventilation and a significantly earlier date of walking in the treated group. There was a reduction in mortality to the treatment group and at three months all the treatment group could walk with support or better, whilst 19/64 of the controls could not.

Plasma exchange started within 12 days of onset and averaged 13·2 litres over 5 sessions. There was no mortality and only minor morbidity associated with the procedure.

Despite using a smaller volume of plasma exchange than Thakaran's group our patient did well and his response compares with their treatment group.

	Our patient	Plasma Exchange group	Control group
Duration of ventilation (days)	11	7·66	14·365
Days to walking	13	18–149	16–365

We suggest that on the basis of published evidence all cases of Guillain Barré syndrome that require ventilation should be considered for early intensive plasma exchange. The Royal Navy is fortunate in possessing a modern and efficient cell separator at RNH Haslar which is ideally suited to this form of treatment.

C M JAMES MRCP(UK) MRCPath
Surgeon Lieutenant Commander Royal Navy
Senior Specialist in Pathology
K W SMITH MRCP (UK)
Surgeon Lieutenant Commander Royal Navy
Senior Specialist in Medicine

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OBITUARIES

Surgeon Rear Admiral (D) Philip Reginald John Daly CB OBE died 12 September 1989 at the age of 64 after a short illness in the Royal Naval Hospital Haslar

Surgeon Rear Admiral (D) F R B Mathias writes

Philip Daly was born in 1925 in North London where he spent most of his youth In 1943 he was accepted as a dental student at the London Hospital from where he qualified in late 1947

Philip joined the Royal Navy in 1948 initially on a Short Service Commission transferring to the Permanent List in 1956 During the earlier years of his service he was fortunate to have appointments which covered a wide range of service life He served in ship stations at Lee-on-Solent and Malta He also served in *Dolphin* as Staff Dental Surgeon to FOSM followed by an appointment to *Hermes* He was elected for promotion to Surgeon Commander (D) whilst serving in Caledonia After a short tour in *Ganges* he was appointed as Officer in Charge of Dental Training This appointment was undoubtedly the turning point in his career With the willing co-operation of those concerned with the way ahead for the Dental Branch he transformed dental training from a somewhat informal approach to the well organised and essential support service it became after his five year tenure in office In recognition of his administrative skills and dedication to the training of dental ratings Philip Daly was awarded the OBE At this time dental training in the Royal Navy was recognised nationally thus allowing dental hygienists to practice their profession in civilian life on completion of their Service career Consequently a closer relationship was established with the General Dental Council and in 1969 Philip Daly became a member of the Central Examining Board for Dental Hygienists He became Vice-Chairman of the External Examiners in 1976 and Chairman in 1977 In my view Philip Daly considered his contribution to dental training as one of the most challenging tasks he ever undertook in the Royal Navy and one of which he was proud

After the Dental Training School Philip was appointed to MOD to become assistant to the Dental Director During this period he was promoted to Surgeon Captain (D) He then became Director of Dental Training and Research a task which he was more than qualified to undertake This was followed by staff appointments Command Dental Surgeon to FONAC and in 1977 Command Dental Surgeon to CINCNAVHOME In March 1980 he was promoted to Surgeon Rear Admiral (D) and appointed as the Director Naval Dental Services, a position he held until September 1983 when he retired During his time as the Director Philip Daly announced the beginning of a [illegible] dental survey to update the statistics of the Dental Services the results of which were to be far reaching in matters of great concern to him and indeed his successors In 1982 he was honoured with the award of Companion of the Order of the Bath

His association with the Armed Forces and with dentistry continued after his retirement as a member of the Armed Forces Committee of the British Dental Association he was involved in the conditions of service within the dental branches of the three Services He was Chairman at the time of his death

Philip was a man of many qualities a somewhat formidable personality to those who did not know him well He was in his element if he was asked to repair anything from a grandfather clock to a car exhaust. But then was no doubt his great love was music for he was an accomplished organist as most of the clergy in the Gosport area and many of Philip's friends will testify Philip had a great sense of civic responsibility and he and his wife Mary involved themselves in many charitable causes, SSAFA in particular

Philip was happily married for over forty years To Mary and their three children David Mark and



Susie who have shown great courage in this time will affect our deepest sympathy

Philip Daly will be sadly missed by his many friends and colleagues and indeed the local community which he served so well

Surgeon Captain Frank Pollard Ellis OBE Royal Navy died 17 August 1989 at the age of 77

Mr Frank Smith sometime Secretary of the Royal Naval Personnel Research Committee writes

Frank Pollard Ellis was educated in Manchester first at the Grammar School and then at the University from 1925 to 1934. He completed his medical degree MB ChB in 1935 and his MD in 1947. He was awarded the OBE in 1946, the OStJ in 1958 and was elected FRCP(Lond) in 1961

He joined the Royal Navy as a Surgeon Lieutenant in 1937 and served during the war in the *Medway* the *Nile* and the *Amphion*. In 1941 he was transferred to the Permanent List and promoted to Surgeon Lieutenant Commander in 1942. In 1944 the Royal Naval Personnel Research Committee was set up by the Medical Research Council and Frank was involved in the administration of the nine committees and numerous sub-committees. It soon became clear in the early days that he had a particular interest in personnel research generally and especially in the extremes of climatic conditions. In 1950 he was promoted to Surgeon Commander and appointed Director of the Tropical Research Unit in Hong Kong where he served from 1950 to 1953 becoming Senior Specialist in Hygiene in 1951. Between 1953 and 1954 he was appointed to the Royal Naval Physiological Research Conjunct. In 1954 he was appointed to HMS *Sultan* as Staff Medical Officer on the staff of Admiral British Joint Services Mission Washington and British Naval and Army Medical Liaison Officer

From 1957 to 1960 Frank was Assistant in the Medical Director General at the Admiralty being promoted Surgeon Captain in 1959. In 1960 he returned to HMS *Sultan*. The remaining years were spent at Haslar and the Royal Naval Medical School wherein he compiled the Statistical Report of the Health of the Royal Navy. In 1966 he was appointed Director of Medical Research and Medical Officer in Charge of RNMS. He was placed on the Retired List in February 1970

Frank's awards include the Gilbert Blann Medal in 1945 the Parkes Memorial Prize in 1947 for his paper The Effect of the Environment on the Health and Efficiency of men in Warships the Chadwick Naval Prize in 1960 and the Erroll Eldridge Prize in 1961

At all times Frank Ellis was known to be dedicated to his Naval and academic matters he was always kind and helpful with guidance to others a very good friend and nonfading and I am very proud to have known him for so many years

He is survived by his wife Margaret there were no children

Warrant Chief Petty Officer (Sick Berth) Thomas Atrill Sampson Royal Navy died in the Royal Naval Hospital Plymouth on 7 August 1989 at the age of 84

Warrant Officer Commander J C McKenzie writes

Jack Sampson joined the Sick Berth Staff on 1 January 1922 aged 17. After training in RN Hospital Plymouth he went on the usual service at sea and abroad. Subsequently he was selected to specialise as an X-Ray Assistant (Radiographer).

A good all round sportsman he was in particular a renowned soccer player playing at home and abroad in several Interport Hospital competitions and in the RNH Plymouth cup winners teams and when his own playing career was over he was regularly seen on the touchline supporting various hospital teams until he retired in 1954.

Qualified for Warrant Wardmaster on 19 January 1939 he was promoted on 18 March 1941. His war service included a long commission on the hospital ship *Isle of Jersey* and an appointment in *Golden Hind* to Australia. Jack's final appointment was as the Wardmaster Lieutenant of RNH Plymouth from 1952 until he retired on 7 October 1954.

His lifetime pride in the Sick Berth Staff in particular and the Naval Medical service in general reflected his own high standards in everything he did and it gave him great pleasure at being elected as Honorary Life Member of the Medical Mess at RNH Plymouth.

At his request his funeral service was held in the Hospital Church of the Good Shepherd where the large congregation contained many serving and retired officers and ratings of the RN Medical service together with many other friends.

Jack Sampson will be sadly missed and our sincere sympathy is extended to his wife Vera, his daughters Jeanne and Joyce and his grandchildren. He was a very fine Sinkbayntsin

A further appreciation of **Surgeon Commander Michael Ranson Royal Navy** has been received from *Surgeon Commander Phyllis Jones*

Michael stamped all that he approached in life with a degree of individualism that was often flamboyant sometimes extremely ratiasa. But always caring. Although so individualistic an extrovert character in the eyes of many he was in the minds of subjects he held dear quite reserved and would indeed have been quite embarrassed to have heard the many words of admiration pride and respect voiced by so many

Often his exuberant zest for work and his enthusiasm left an air of confidence expressed to his patients covered quite deep personal problems but if Michael ever fell short of his own very high standards it was only through his self imposed ethic of total commitment to the task in hand when the sheer number of tasks necessitated even his energy

The circumstances of his death make his loss all the more tragic but there is a legacy that any man would be most proud to acknowledge in the stamina strength humour and learning seen in the children of his marriages

We have recently learnt of the death of Surgeon Captain P S Butler RN on 15 December 1989 and also of **Surgeon Captain E A Pinn DSC RN** Obituaries will be published in the next issue

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SERVICE NEWS

ROYAL NAVAL MEDICAL AND DENTAL OFFICERS

HONOURS

The Most Venerable Order of the Hospital of St John of Jerusalem
Commander (Brother)
Surgeon Rear Admiral D A Lamminman

Officer (Brother)
Surgeon Captain F StC Golden
Surgeon Captain D L Swan
Surgeon Captain (D) B Robinson
Surgeon Captain (D) S N Russell

APPOINTMENTS AND PROMOTIONS

To Surgeon Commodore and appointed Director of Clinical Services
23 January 1990
A L Revell

To Surgeon Commodore (D) and appointed Director of Dental Services (Naval)
11 May 1990
B Robinson

As Queen's Honorary Physician
Surgeon Captain P J Truesdale

As Head of Defence Radiological Protection Service
13 March 1990
Surgeon Captain J R Harrison

To Surgeon Lieutenant Commander
A W Scott Brown

To Surgeon Lieutenant Commander (D)
M W Bray A D Kerling

To Surgeon Lieutenant
D J Burt A L M Judd
G C O Shelford

To Surgeon Lieutenant (D)
B G L Jameson C C Morrison

Provisional Selections for Promotion
30 June 1990

To Surgeon Captain
J D Burhman

To Surgeon Captain (D)
G H A Rudge

To Surgeon Commander
L J Jarvis S J Ryder P J Waugh
G M F Woodroof

AWARDS

Surgeon Commander A J Hirst and Surgeon Lieutenant P J Sinton
have been awarded
the General Service Medal
with 'Gulf' clasp

The Gilbert Blane Medal for 1988
has been awarded to
Surgeon Commander D J Baker
for his work on the clinical neurophysiology of organophosphate poisoning.

Surgeon Lieutenant M M Parrish
has been awarded Second Prize in the First Royal Naval Amateur Photographic Competition
(A copy of Surgeon Lieutenant Parrish's prize-winning photograph appears elsewhere in this Journal)

COMMENDATION

Surgeon Lieutenant Rod Dunn has earned the Commander British Forces Hong Kong's Commendation for his outstanding contribution during the Nepal earthquake in August 1988. At the time he was a medical student and serving with the Royal Marines Reserve. He was undertaking a surgical elective in British Military Hospital Dharan and immediately following the earthquake reported for duty at the hospital where he worked tirelessly in appalling conditions of rain, mud and wind dealing with the initial reception of 450 casualties. He continued to work unceasingly to help the Surgeon cope with the

admissions, taking decisions and performing tasks way above those normally asked of a medical student His attention reads.

His dedication clinical professionalism and willingness to cope with an enormous workload were an example He deserves the highest praise and recognition

The picture shows Surgeon Lieutenant Dunn receiving his commendation certificate from Surgeon Captain David Swann Medical Officer in Charge Royal Naval Hospital Plymouth



CONSULTANTS, SENIOR SPECIALISTS AND SPECIALISTS

The following professional advancements are announced

Senior Specialists

Occupational Medicine

Surgeon Lieutenant Commander C J Stott
Surgeon Lieutenant Commander S J Ryder

Specialists

Pathology

Surgeon Lieutenant Commander P G Monteith

Anaesthetics

Surgeon Lieutenant Commander A J Burgess
Surgeon Lieutenant C B Berry
Surgeon Lieutenant P R F Davies

HIGHER QUALIFICATIONS

Surgeon Captain J W Davies—FFOM
Surgeon Captain R R Pearson—FFOM
Surgeon Captain C W Millin—FRCGP
Surgeon Commander C N Warlow—DipGUMed
Surgeon Commander (D) J R T Hayward—MSc (Oral Surgery)
Surgeon Lieutenant Commander R C Scott—FCAnaes
Surgeon Lieutenant Commander C M James—MRCPath
Surgeon Lieutenant J M Price—MRCP

NEW ENTRIES

Surgeon Lieutenants (D)
S J Pearson K A Poole

Surgeon Sub Lieutenants P R Cook
M Every J Finlay N Greenham
K A N Houlberg (Miss) E A Nichols
(Miss) F M Norgrey R F Powell
S M Tallam

Surgeon Sub Lieutenants (D)
(Miss) F M Everad J J Mattany
N R Trimbell S J Wolstencroft

Editorial note Surgeon Lieutenant (D) Minton whose entry into the Royal Navy was noted in the Winter 1989 issue of the Journal should have initials D W and not P A as shown

TRANSFER TO FULL CAREER COMMISSION

Surgeon Commander A R Mogridge

RETIREMENTS

Surgeon Commander D I Riddell MBE
Surgeon Lieutenant Commander D R Bathurn

Surgeon Commander K H Taylor has been elected to the Council of the British Society of Gastroenterology

Professor D F N Harrison Civil Consultant to the Royal Navy in Otorhinolaryngology has been created a Knight Bachelor in the New Year Honours List

MEDICAL SERVICES

PROMOTIONS

To Lieutenant Commander
E G Bootland D J Golding,
R J Pulvirenti

To Chief Petty Officer Medical Assistant
T Arnott R N Cum W A Dixon
C E Flack G C Hymas M H Parkinson
M J Pickett D J Ringham G W Selfe
P J Tunnicliffe

To Chief Medical Technician
D W Cuthbert

NEW ENTRIES

Acting Sub Lieutenants I H Bennett,
D A Griffiths

RETIREMENTS
Lieutenant Commander M Higgins

HONOURS
The Editor has been made aware that **Lieutenant Commander J F Hammond RN Retired** has been created *Commander (Brother)* of the Most Venerable Order of the Hospital of St John of Jerusalem

QUEEN ALEXANDRA'S ROYAL NAVAL NURSING SERVICE

NEW YEAR HONOURS 1990

Commander of the Order of the British Empire
Principal Nursing Officer E M Northway RRC QHNS

Royal Red Cross
Principal Nursing Office J Tuley

Associate of the Royal Red Cross
Superintending Nursing Officer
F M Bacon Upshon
Superintending Nursing Officer
H R M Schofield

HONOURS
The Most Venerable Order of the Hospital of St John of Jerusalem
Officer (Sister)
Superintending Nursing Officer
E M Chandler

Serving Sister
Principal Nursing Officer J Tuley RRC

APPOINTMENTS AND PROMOTIONS
As Queen's Honorary Nursing Sister
Principal Nursing Officer
J Tuley RRC

As Deputy Director Defence Nursing Services and Matron in Chief
6 February 1990
Principal Nursing Officer
J Tuley RRC

To Principal Nursing Officer
J Massey ARRC

To Chief Nursing Officer
C M Poole ARRC

To Senior Nursing Officer
E J Kirby

To Chief Petty Officer RGN
A Dobson S J Middleton

To Chief Petty Officer EN(G)
P H Allen M S Smith

To Chief Petty Officer Clerical and Quarters Assistant
V A Kirwan

NEW ENTRIES
Senior Nursing Officers R Maddrman
C L Riley
Nursing Officers J E Crisp C Hicks
A J Livingstone A E Parker S A E Royle

WITHDRAWN ON COMPLETION OF SHORT CAREER COMMISSION

Senior Nursing Officer J E Dryden

RETIREMENT
Principal Nursing Officer
E M Northway CBE RRC

ROYAL NAVAL RESERVE

APPOINTMENTS AND PROMOTIONS
To Surgeon Lieutenant Commander
R P Norwich (*Ilsing Fox*)
L Stone (*Laglet*)

To Surgeon Lieutenant (D)
R K Bennell (*Englet*)
M D Park (*Calthope*)

NEW ENTRIES
Probationary Surgeon Lieutenants
J R Hindmarsh (*Paragon*)
D A Siell (*Grahan*)
I E C Wilkinson (*Sherwood*)

CONFIRMED IN RANK
Surgeon Lieutenant G D Gardiner (*Churchouse*)

REMOVED FROM ACTIVE LIST
D W Morgan (*Forward*)

PLACED ON RETIRED LIST
Surgeon Commander D J Peters (Sussex)

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No 2 Summer 1990 Vol 76

JOURNAL of the ROYAL NAVAL MEDICAL SERVICE

(The Ministry of Defence [Navy] does not accept responsibility for any statement made in this Journal)

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Manuscripts should be prepared in the Vancouver style [1,2]. They should be typewritten with double spacing and wide margins and should include: title page; abstract (of not more than 150 words); introduction; method; results; discussion and references, each section commencing on a separate page. A convenient length is between 2000 and 3500 words, plus essential tables or illustrations.

Tables and illustrations should be referred to in the text. Tables should be typed in double spacing on separate sheets. Figures should be professionally drawn, making due allowance for the appropriate reduction. Glossy black and white photographs should be submitted unmounted, whenever possible. Titles and detailed explanations should be given in the legends which should be typed on a separate sheet.

References should be numbered consecutively in the order in which they are first mentioned in the text. At the end of the article the full list of references should give the names and initials of all authors (unless more than six, when only the first three should be given followed by *et al*.). The authors' names are followed by the title of the article, the title of the journal abbreviated according to the style of *Index Medicus*, year of publication, volume number and first and last page numbers. Titles of books should be followed by the place of publication, the publisher and the year, e.g.

> Soter NA, Wasserman SI, Austen KF. Cold urticaria: release into the circulation of histamine and eosinophil chemotactic factor of anaphylaxis during cold challenge. *N Engl J Med* 1976; 294:687–90.
> Osler AG. *Complement: mechanisms and functions*. Englewood Cliffs: Prentice-Hall, 1976.

1. The Vancouver style. *J roy nav med Serv* 1979; **65**:179.
2. International Committee of Medical Journal Editors. Uniform requirements for manuscripts submitted to biomedical journals. *Br Med J* 1982; **284**:1766–70.

NOTICE

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Editorial
Women at Sea

IT has to be recognised that while there are numerous incidents recorded where ladies have by subterfuge served with the Fleet both in the Royal Navy and Royal Marines they have not until recently been able to do so with the approval of the Admiralty Board This equality of opportunity announced in early February 1990 brings in train an enhancement of the spectrum of personnel and medical commitments to be borne by Medical Officers and Medical Branch ratings and of course their Dental Officer colleagues

The initial tranche of Wrens to serve afloat will of necessity be volunteers as in the past the conditions of service extant did not require entrants to the Women's Royal Naval Service to serve other than ashore Ultimately and assuming the vociferous objection of a few Naval wives protesting at this decision does not prevail all entrants to the WRNS will be liable for sea service.

Just as the NAAFI Manager will have recognised this change in a potentially profitable new clientele whose requirements will inevitably extend beyond his present stock items so will the catalogue of medical stores and equipment carried in warships have to be expanded to provide for the new factors in the popniation at risk

A revision of the course content used in training both Medical Assistants (MA's) and their female counterparts the MA(Q)s to prepare them for this new seagoing challenge is already implemented and in the case of the MA(Q) there is also additional Naval general training which equates with that of the seagoing Wrens because the MA(Q) will also be liable for service at sea in certain specified bulls

The nursing cadres both ratings and officers of the Queen Alexandra's Royal Naval Nursing Service or at least the female members of the unified Nursing Service continue to have a seagoing role during hostilities but not in peacetime

The new perspective will also allow female Medical and Dental Officers to enjoy wider horizons than their present appointment opportunities which are limited to establishments and hospitals They of course already hold a Commission and appear alongside their male counterparts in the Navy List

This is perhaps timely as whatever the effects of the demographic ironah Medical and Dental Schools have for some time been educating a fifty fifty mix of male to female students Of those qualifying the ladies who traditionally are more assiduously applied to their studies are on the threshold of numerically out numbering the male graduates The time is not so far distant that a future Editor of your Journal may be more comfortable in a skirt than trousers

1990
75th ANNIVERSARY

The first publication of the Journal of the Royal Naval Medical Service was in January 1915 Volume I comprising the four issues of that year The Editorial Committee are to mark this milestone by offering a commemorative prize

THE JOURNAL OF THE ROYAL NAVAL MEDICAL SERVICE 75th ANNIVERSARY PRIZE

75 Guineas to be awarded to the author of the best paper submitted by a member of the Royal Naval Medical Services during 1990 who remains under training ie not graded consultant or of equivalent status

The entries will be assessed by the Editorial Committee whose decision will be final

J roy nav med Serv 1990 76 68–74

The Neurological Sequelae to Toluene Inhalation

M S Smith

IT is difficult to keep up to date with all the possible medical effects of contact with materials in the work place. Often one is presented with a medical condition and asked if this could be related to occupational exposure to a substance. This review is the result of such a case.

The patient in question was born in 1954 and with the exception of a possible febrile convulsion in infancy his previous medical history was unremarkable. There was however a family history of mental illness and his brother was schizophrenic. In 1980 the patient began working with an impact adhesive system gluing rubber tiles onto submarine casings. Whilst engaged in this process workers wore twin filter masks the filters usually being changed every two days and occasionally being changed daily if required. He was relatively healthy until November 1981 when following a period of working in a confined space with relatively poor ventilation he complained of feeling unwell (headache nausea epigastric cramp dizziness and difficulty in speaking). This was followed four days later by what may have been a short epileptic fit (the exact history coming from relatives being very vague) as a result of which he was sent to a local hospital. No abnormalities were found and he was discharged on no treatment.

Around the time of the first fit he had read a magazine article linking certain cases of neurological disease including epilepsy to the inhalation of organic solvents. He was well aware that these were used as a base for the impact adhesive and put forward a claim that his fit had been the result of exposure to such solvents. The matter was investigated and the only chemical found to have consistently exceeded its Occupational Exposure Limit (OEL) to any significant extent was toluene levels of between 160 and 487ppm being recorded. The current OELs for toluene are 100ppm (8hr Time Weighted Average (TWA)) and 150ppm (10min Short Term Exposure Limit (STEL))[1].

Toluene is an organic solvent commonly used as a base for glues lacquer thinners and paint sprays. It is a hydrocarbon composed of a benzene ring with an attached methyl group (see *Fig 1*). Toluene has a vapour pressure of 22mm Hg at 20°C a melting point of −95°C and a boiling point of 110.6°C.

The primary route of entry for toluene vapour is through the lungs it being poorly absorbed through the skin. Approximately 70–80% of absorbed toluene is oxidised in the liver to form benzoic acid which is in turn conjugated with glycine to form hippuric acid. The hippuric acid is then excreted via the kidneys[2].

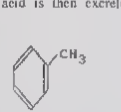


Fig 1

At atmospheric levels of 100ppm subjects report headache dizziness and a feeling of

Surgeon Lieutenant Commander Smith is currently appointed to Birmingham University where he is studying for his MSc.

intoxication[3] In the concentration range between 200 and 660ppm toluene causes transient excitement euphoria and exhilaration Tinnitus is also frequently reported in this exposure range[4 5] As the level becomes higher the subject becomes nauseated and may vomit Visual and auditory hallucinations occur and if the level continues to rise co-ordination starts to deteriorate If exposure persists coma ensues

Deliberate inhalation of organic solvents is a well known social problem As one author[2] states over the past decade glue sniffing has almost reached epidemic proportions among adolescents in some communities Inhalation of organic solvents is also a recognised problem in industry Over the period 1961 to 1980 384 accidents were reported as being due to exposure to solvents of which nine cases were deliberate[6] It is evidently possible to be exposed to clinically significant levels of solvent without being aware of it

Several cases of seizures have been reported while a patient is under the influence of toluene but it has not yet been demonstrated whether this was due to toluene hypoxia (due to the method of inhalation) or a combination of the two[2,5 7] In King s paper[1] the brain and blood toluene levels of a 15 year old who died in status epilepticus was quoted as 14 5ug/g and 0 035ug/g respectively yet in two other fatalities (suicide following hallucinations) brain and blood toluene levels were 98 6ug/g and 39 6ug/g for one and 55 9ug/g and 54 0ug/g for the other These levels are very much higher than those quoted in the epileptic case, implying that there was some other factor involved

Animal studies vary in their findings A study in cats[8] showed that toluene induced focal seizures in their limbic systems whereas a study in rats[9 10] using the same system that is used to test anti-epileptic drugs in man showed it to have an anti-epileptic effect

It is interesting to note that our subject s fit occurred four days after exposure by which time tissue toluene levels would have been less than half their original values the biological half life of toluene being three days [1] In all the cases of seizures in solvent abusers the original fit has occurred during or soon after inhalation His initial symptoms did fit with those one would expect from slight exposure to toluene

If exposure is short term complete recovery is the norm with no residual after effects Long term exposure is another matter

The most commonly reported persistent neurological complications of chronic toluene inhalation are cerebellar and pyramidal disorders, tremor and ataxia being the usual presenting signs[11 18] In a Canadian study[12] of 24 chronic toluene abusers, 45% had tremor (intention postural) and 45% showed degrees of ataxia (trunk limb) Cerebellar signs were shown to correlate significantly with CT scan measurements of the cerebellum in particular the width of the cerebellar sulci which were markedly enlarged in long term toluene abusers. Those patients with cerebellar signs had the largest sulci (4 34mm +/− 0 77) when compared with abusers without cerebellar signs (3 03mm +/− 0 92) and control subjects (0 36mm +/− 0 8) Cerebellar and cerebral atrophy were demonstrated in the study group these findings being strongly supported by further work in the United States[1 19]

The Canadian study also found that there was no clear relationship between chronicity level of current abuse and the neurological and radiological scores Other contributory factors were postulated including hypoxia during inhalation and patient malnutrition Whilst this is possible there is as yet, no evidence to support either of these factors in the lack of correlation between total toluene abuse and the clinical and morphological findings

The evidence suggests that a period of between six and ten years of chronic toluene abuse is required before diffuse brain damage occurs Once this has happened recovery following abstention is minimal[12, 3 14]

A less common problem found was optic atrophy Approximately 8% of the subjects in the Canadian study had signs of optic atrophy other authors[1,2,19,20] having also noted diminished visual acuity and colour vision in some of their subjects Keane[21] gives a very detailed account of such effects on a Mexican youth who had been abusing toluene for about three years and noted a significant improvement following abstention

Varying degrees of hearing loss have been attributed to toluene inhalation Fornazzari[11] found 8% of his study group to have significant sensorineural hearing loss while Lazar[19] noted that one in three of his patients tested had signs of audiologic dysfunction This association is supported by other studies[14 18] but there appears to be no detailed study accurately describing the patterns or severity of hearing loss related to toluene exposure

Peripheral neuropathy is a well known complication of repeated inhalation of the organic solvent n-hexane[1] but it has also been reported

Table 1 Acute effects of toluene inhalation

Toluene concn (air)	Symptom/sign
100ppm	Irritation to eyes and nose
200ppm	Euphoria excitement exhilaration tinnitus headache dizziness
600ppm	Confusion auditory and visual hallucinations nausea vomiting incoordination
800ppm	Depression of consciousness coma

as an effect of toluene inhalation[12] The possibility of n-hexane contamination does not appear to have been adequately examined and there is no further evidence from other studies to corroborate these conclusions It only requires a duration of one to two months of n-hexane abuse to produce significant clinical signs[22]

A rare but interesting complication of chronic toluene abuse is hypokalaemic periodic paralysis[4] The hypokalaemia occurs secondarily to renal tubal acidosis the tubular defect involving the distal segments[23] One patient admitted on three occasions with profound weakness had potassium of 2 3 1 4 and 1 5 mg/ml respectively[4] and there is at least one recorded case[24] of a patient dying from the cardiac effects of the hypokalaemia as a result of toluene inhalation

equally applicable to acute intoxication[6 25] Many criticisms were levelled at the King paper including lack of information on duration and type of solvent abuse and the persistence of symptoms[5 26] In reply the authors remained vague They stated that the recovery period varied from three to 14 days but gave no indication of relative distribution and despite naming three proprietary brands of solvent each of which contained toluene found to have been used in 14 of their 19 cases, they failed to investigate other forms of solvent abuse prior to the episode necessitating admission to hospital

The definition of where intoxication ends and encephalopathy begins remains a problem but there is evidence to support the concept that chronic toluene inhalation can cause diffuse brain damage the duration of abuse required

Table 2 Neurological effects of chronic toluene inhalation

Disorder	References
Cerebellar/pyramidal dysfunction*	1 4 7 11 12 13 14 15 19
Cortical dysfunction*	1 4 7 11 13 15 16 19
Optic atrophy	1 11 17 18 19
Hearing loss	11 17
Hypokalaemic periodic paralysis	4

NB * = commonest presentations

Over the past few years there has been much debate over the existence of a so-called solvent encephalopathy In 1981 King *et al*[5] described 18 cases of solvent encephalopathy in children aged between eight and 14 years It is unfortunate that this paper has had such a profound influence on the general perception of the subject as closer examination reveals that the conclusions are mostly conjectural and even the term solvent encephalopathy is never adequately defined the symptoms listed being being between six and ten years[12] It is thought that other factors such as malnutrition and genetic make-up are influential in this process[12 26]

Over the next three years our patient had four further fits one of which was well documented and classical of Grand Mal epilepsy He was consequently fully investigated by a hospital specialist The results of all the investigations were normal but he was started on carbamazepine by his GP He remained trouble free on a

dose of 200mg mane and 100mg nocte the usual adult maintenance dose range being 0·8–1·2g daily [17]

By 1985 he was also complaining of mood changes problems with memory and auditory hallucinations

Many of the papers reviewed have reported an association between toluene inhalation and psychological impairment. Certainly our patient displayed some rather peculiar behaviour but it was difficult to assess the role of toluene in this as his own doctor described him as being 'rather odd' before the incident and there was a strong family history of schizophrenia. In addition, the patients with psychological impairment were almost exclusively those with other signs of neurological damage [12,13,14,18].

When workers in a rubber shed of an asbestos factory exposed to toluene levels of 100–200ppm for five years or more were compared with a matched control group [24] there was no statistical difference in the performance of behavioral tests. This conflicted with previous reports primarily from Scandinavia [25,26] which showed that exposed workers performed less well on tests of memory, non verbal skills and psychomotor co ordination. It has been postulated that this difference is due to the fact that the Scandinavian studies did not adjust the test to allow for the varying pre exposure intellectual capacity as was done in the British study.

In 1988 our patient went before a Medical Appeal Tribunal and was awarded compensation under the Social Security Act 1975 as having suffered from a prescribed disease class C7 namely poisoning from benzene or a monologue of benzene. The case was based mainly on psychological and psychiatric changes two of the symptoms being first rank symptoms of schizophrenia of particular interest in view of his strong family history of the disease and the research evidence outlined in the previous paragraph.

In terms of prevention suitable masks were available and instruction in their use given, although it did not appear to have been properly understood. Changing of the filter at the appropriate intervals had been ignored to a large degree as it increased the time taken to complete a job. Steps were taken to rectify the situation and more stringent measures were taken to ensure correct usage of the safety equipment.

In summary it can be concluded that toluene inhalation does not cause epilepsy per se, but may contribute to it in states of hypoxia.

Toluene inhalation is also responsible for a number of neurological conditions as outlined in *Table 1*, but the role of low level toluene exposure in neurobehavioural disorders has not been established. Respiratory protection is of paramount importance when the TLV is exceeded and rigorous adherence to correct working practices needs to be enforced. Thackrah's 250 year old maxim still holds true:

> We remark with regret the means inattention to health, their indifference to the prevention of disease. They think nothing of the injurious agents till their health is destroyed, and the time for prevention is past.

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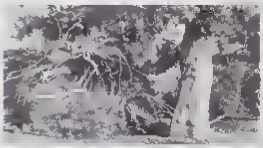
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Visitors to Royal Naval Hospital Haslar will no doubt have remarked on the disappearance of a large holm oak (Ilex) from the area between the Staff School and the Chapel. This tree was an unfortunate casualty of the storms of the earlier part of this year. The pictures show the aftermath of the storm (*Figs. 1 and 2*) compared with a picture of the school taken during the summer of 1989 (*Fig. 3*).



Fig. 1





Figs. 2 and 3

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An outbreak of 'Flu

A W Lambert

INTRODUCTION

A common presenting complaint at many Sick Bays particularly during the winter months is that of 'flu. This term means different things to different people. It is defined as "an acute infectious and febrile disorder caused by a virus usually with fever, rapid prostration, severe aching and catarrh often occurring in epidemics" [1].

To many patients 'flu is simply a feeling of general malaise and is sometimes interchanged with the term common cold.

The Clinician recognises 'flu as a specific acute illness caused by a myxovirus. An influenzal infectum is characterised by the sudden onset of malaise, headache, myalgia, sweats and anorexia with or without nausea and vomiting. The patient is febrile and may describe chills and shivering but rarely exhibits true rigors. Typically there is a marked tachycardia [2]. In the majority of cases no further symptoms develop and recovery is complete within seven days. Primary influenza viral pneumonia may follow and cause significant morbidity as it does not respond to antibiotics. Other complications include bronchitis, bronchiolitis and bronchopneumonia as a result of secondary bacterial infection. Uncommon and more debilitating complications include encephalitis, post influenzal asthma, depression and acute post viral polyneuropathy (Guillain Barré syndrome). There has also been recent interest in a rare but long-lasting complication known as chronic fatigue syndrome [3]. Most uncomplicated cases of influenza respond to supportive therapy which includes bed rest, rehydration and the administration of a mild analgesic/antipyretic until the fever has subsided. A linctus may be given to suppress a non-productive cough.

Three types of influenza virus have been described—Influenza A causes pandemics of infection and this is thought to be due to its antigenic instability. The influenza B virus is more stable and has been associated with outbreaks at Schools, Colleges and Barracks. Influenza C is not fully classified or understood at this time.

AIM

The study was designed to determine the number of subjects presenting with 'flu like symptoms (FLS) and fever who had laboratory evidence of recent infection with an influenza virus.

PATIENTS AND METHODS

During the Spring Term 1988 at the Commando Training Centre Royal Marines Lympstone (CTCRM) a large number of individuals presented to the Sick Bay with FLS. For the purpose of this study the following complaints or ailments were included –

General malaise
Pharyngitis
Sinusitis
Upper respiratory tract infection
Chest infection

Patients presenting with one or more of the above complaints and an oral temperature above 39.5°C were included in the study.

On the day of presentation and ten days later

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venous blood samples were taken from those patients who fulfilled the entry criteria for the study. The initial and convalescent sera were tested by Complement Fixation and Immunofluorescence techniques for evidence of infection.[4,5] The local Microbiology Laboratory in Exeter routinely tested serum samples for influenza viruses A and B as well as Chlamydia Group B (psittacosis) Coxiella burnetti (Q fever) Mycoplasma pneumoniae and Varicella zoster. Serological evidence of infection was defined as rising titres to a specific antibody.

RESULTS

In the Camp at any given time between 19 January and 14 March 1988 there was an average of 1 700 personnel entitled to medical treatment at the Sick Bay. During this period 368 patients with FLS reported sick. Sixty three (17%) of those who presented with FLS fulfilled the entry criteria for the study (*Table 1*).

Table 1

	n
Patients with FLS	368
Patients with FLS and temp 39.5°C	63
Patients with positive serology	35

Thirty-five of these 63 patients (56%) were found to have serological evidence of recent infection with one or more of the viruses (*Table 2*). Thirty-two of these patients (90%) had been infected with the influenza B virus alone. One patient (3%) had been infected with both influenza A and B viruses.

Table 2 Study patients from whom positive influenza serology was obtained

	n	%
Influenza A	0	0
Influenza B	32	90
Influenza A and B	1	3
Influenza A and Varicella	1	3
Influenza B and Coxiella	1	3

One 18 year old patient showed evidence of infection with influenza A and Varicella zoster. Four days after his convalescent serum was taken he was admitted to the Ward with an Haemophilus influenzae bronchopneumonia. One 23 year old patient initially showed evidence of infection with influenza B virus but one week after his convalescent serum was taken he presented again complaining of increasing muscle weakness. A third sample showed rising titres of antibody to Coxiella burnetti. His condition deteriorated and 18 days after initial presentation he was admitted to Hospital with Guillain-Barré Syndrome. He did not require ventilatory support but remained in Hospital for eight weeks. After intensive Physiotherapy and rehabilitation he completed his Commando Training and passed out of Lympstone seven months after discharge from Hospital.

In addition to the influenza infections three other patients were found to have had recent Coxiella burnetti infections and one of these had rising IgM titres to Hepatitis A virus.

DISCUSSION

Upper respiratory tract infections are common. The incidence is higher in areas where apparently healthy individuals are crowded together for example in Schools, Colleges and Barracks. The Commission on Acute Respiratory Diseases (1948) found sporadic cases of infection with influenza viruses A and B in a population of Servicemen in the absence of outbreaks. This latest study has shown an outbreak of infection with influenza B virus amongst personnel at CTCRM in the Spring Term 1988 and is consistent with the known epidemiology.[2] In most cases symptoms were mild and self limiting. There was one case of Guillain-Barré syndrome.

There is no evidence that general health as assessed by PULHEEMS grading and training performance infers greater resistance to infection. The population at CTCRM is generally healthy when assessed in terms of physical fitness but despite this the outbreak seriously affected the training of affected individuals by incapacitating them.

ACKNOWLEDGEMENT

I am grateful to Dr J G Cruikshank MA MD FRCPath Consultant Microbiologist Royal Devon and Exeter Hospital Exeter for examining the serum samples. My thanks go to Miss Jackie Smith for secretarial assistance.

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The commissioning of the CT Scanner at Royal Naval Hospital Haslar: *(from left to right)* Surgeon Rear Admiral D A Lamminman LVO Surgeon Rear Admiral (Support Medical Services) Rear Admiral Jonathan Tod CBE Flag Officer Portsmouth Surgeon Captain F StC Golden OBE Medical Officer in Charge RNH Haslar Surgeon Commander C D Houghton Consultant Advisor in Radiology an unidentified volunteer Surgeon Vice Admiral Sir Godfrey Milton-Thompson KBE QHP Medical Director General (Naval) Surgeon Vice Admiral Sir John Hatrison KBE a former MDG(N) and two representatives from Messrs Toshiba who provided the equipment

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Operating at Sea in an Aircraft Carrier

D A Hett and E P Dewar

Summary

The policy of the Medical Officers serving in HMS *Ark Royal* between January 1988 and June 1989 with regard to surgery and anaesthesia at sea is described.

The skills and equipment available techniques used operations performed and complications that resulted are outlined.

The advantages and disadvantages of an active operating policy are discussed and the postulate ventured that in order to achieve maximum efficiency within the medical department of an aircraft carrier such a policy is justified.

Finally in the light of present day litigious trends the question of the propriety of the policy is posed.

INTRODUCTION

The Royal Navy has three aircraft carriers of the Invincible class namely HMS *Invincible* HMS *Illustrious* and HMS *Ark Royal*. When fully operational each of these ships has a complement of approximately 1200 men. Medical support is provided by a fully equipped Medical Department staffed by two medical officers and seven Medical Branch ratings. Both medical officers are hospital specialists one a surgeon the other an anaesthetist. One of the Medical Branch ratings is a qualified operating department assistant and another a laboratory technician. Included within the Medical Department is an operating theatre furnished with a full range of surgical and anaesthetic equipment with the capability to handle most surgical emergencies.

A policy of operating at sea on elective cases as well as emergencies was followed in HMS *Ark Royal* to develop and prove the operating routines in order to reduce the risks inherent in emergency surgery. The aim of this study was to assess the efficacy and acceptability of this policy taking account of the limitations to surgery on board and the medico-legal ramifications.

Surgeon Lieutenant Commander Hett is currently appointed to Royal Naval Hospital Haslar. Surgeon Commander Dewar is Head of Surgery at Royal Naval Hospital Plymouth.

BACKGROUND

Programme Between January 1988 and June 1989 HMS *Ark Royal* spent approximately 17 months away from her home base of Portsmouth. Of these 12 months six were spent on OUTBACK 88 a deployment to the Far East and Australia as the Flagship of a task group including five other ships (Total manpower 2000). For the rest of the period the ship was involved in exercises in the North Sea and Atlantic but was virtually always in the company of other ships.

Personnel During this time the Principal Medical Officer was a Consultant General Surgeon and his deputy an anaesthetist of Registrar grade.

Surgical Equipment A full range of basic surgical equipment was carried to allow all forms of emergency surgery but without the refinements of items required for major vascular surgery.

Anaesthetic Equipment and Drugs A standard BOC Boyles machine fitted with a Drager Halothane vaporiser was supplied. All medical gases were supplied from cylinders. An oxygen monitor was attached to the Boyles machine and full suction apparatus was available. Auto-

mntic ventilation could be achieved using an East Radcliffe Positive—Negative Respirator Full vital signs monitoring was feasible nsing an ECG monitor nnd n Dinamap vital signs recorder An oscillotonometer was also available

The following anaesthetic drugs were held on board

a) Induction agents
Thiopentone Propofol Ketamine
b) Neuromuscular blockers
Atracurium Pancuronium
Suxamethonium
c) Opiate analgesics
Papaveretum Fentanyl Morphine Sulphate
d) Inhalational agent
Halothane
e) Local anaesthetics
Lignocaine 1% Prilocaine 0 5%
f) Reversal agent
Neostigmine

A full range of emergency drugs was also held with exception of Dantrolene

ANAESTHETIC TECHNIQUES

All surgical procedures were carried out using local anaesthetic techniques if possible The techniques nsed included local infiltration and intravenous regionals No brachial plexus blocks were attempted as experience in these was limited and no epidural or spinal anaesthetics were given

The standard general anaesthetic technique employed is outlined below

a) Premedication
Papaveretum 15–20 mg IM 1 hour preop
Hyoscine 0 3–0 4 mg IM 1 hour preop
b) Induction.
Thiopentone 5 mg/kg IV
Atracurium 0 3–0 5 mg/kg IV
Fentanyl 0 1–0 2 mg IV
c) Intubation.
MacIntosh laryngoscope and either Portex or Oxford endotracheal tube
d) Maintenance
Nitrous oxide 4 litres/min
Oxygen 2 litres/min
Halothane 0 5%
Delivery via a Bain circuit using the East Radcliffe ventilator connected to a 1 metre length of tubing which was in turn connected to the Bain circuit in place of the reservoir bag
e) Reversal
Atropine 1 2 mg
Neostigmine 2 5 mg
f) Extubation
In the conventional manner when the cough reflex had returned
g) Monitoring
ECG RF Heart rate % Oxygen delivered Tidal volume Inflation pressure Vaporiser settings Gas cylinder pressure

This technique was employed in all general anaesthetics unless either of two instances pertained. Firstly if in an emergency situation the patient was considered not to have an empty stomach In this case a rapid sequence induction using Sellick's manoeuvre and Suxamethonium 100 mg was performed This variation was used in seven cases

Secondly if the anaesthetic required was of very short duration n spontaneous breathing technique was employed nsing Thiopentone (four cases) or Diprivan (six cases) as the induction agents The patient then breathed a mixtnre of Oxygen Nitrous oxide and Halothane 1 5%

The standard technique was nsed because following safe induction of anaesthesia the ODA who had noted as the anaesthetic assistant up to this point then had to scrub to assist the surgeon The anaesthetist was subsequentiv not nvailed of the help of an experienced anaesthetic assistnnt until the end of the operation It was therefore necessary to have complete control of the patient s airway and have both hands free nt all times The other rationale for using such a technique was that recovery from nnaesthetic is qnicker and the patient has control over his own airway sooner than with a spontaneously breathing technique With the limited recovery facilities and no experienced recovery staff the recovery period was supervised by the anaesthetist

OUTCOME

Procedures

Using local anaesthetic techniques 115 procedures were carried out during this 18 month period These included vasectomies excision of cysts and naevi diathermy of warts and local ligation of varicose veins Nine operations on

forearms and hands were performed under IVR using either lignocaine 0 5% or prilocaine 0 5%

A further 50 surgical procedures were carried out under general anaesthetic Of these ten were classified as emergencies and the remainder elective cases

Surgical Morbidity

There were three minor complications a minor wound infection following Trendelenburg operation a recurrence of a mucous retention cyst of the tongue which was excised at a second operation and a lymphocoele following a Trendelenburg operation which resolved spontaneously

Anaesthetic Morbidity

There was one case of laryngospasm which resolved spontaneously without problem and one moderately difficult intubation Several instances of local histamine release were noted around injection sites and on occasions nodal rhythms occurred in patients spontaneously breathing Halothane

DISCUSSION

With a population of 2000 prospective patients it was correctly assumed that surgical emergencies would occur at sea during this period January 1988 to June 1989 It was also felt that the potential for major trauma in the environment of an aircraft carrier was high Surgery and anaesthesia at sea in a non-hospital environment with infrequently used equipment would we felt increase the risks involved and only by developing familiarity with our facilities could those risks be reduced

Since the required skills and equipment were available we therefore adopted the policy that to suitable patients minor/intermediate routine surgery should take place as well as emergency surgery Also that the requirement for general anaesthesia in a proportion of the routine cases should not preclude the operation being performed

The direct effect of this policy was that all members of the Medical Department and in particular the Surgeon the Anaesthetist and the Operating Department Assistant were well practised in the use of the operating theatre and equipment and were fully conversant with the problems of operating at sea as opposed to within the hospital environment We believe that this practice did reduce the risks entailed in performing emergency surgery at sea

There are other advantageous aspects of this policy which add to its benefit

a) The deficiencies in the scale of stores for an aircraft carrier soon came to light and were able to be rectified For instance no perineal set of attachments was provided and although a diathermy set with attachments was provided, there was no provision for replacing non functioning diathermy leads as they did not feature as a separate item on the scale

b) The limitations of operating at sea with the facilities of an aircraft carrier became rapidly apparent This was particularly highlighted when on one day five procedures were performed four under general anaesthetic and one using an IVR technique The operations were a circumcision inguinal herniorrhaphy and bilateral vasectomy diathermy of penile warts excision of mucous retention cyst of the tongue and reduction toilet and suture of a compound fracture of a finger The list started at 1030 and was completed at 1630 All procedures however simple take at least one hour in these circumstances As a result it is estimated that the medical team in a carrier can only realistically operate upon at most ten major casualties in a 24 hour period

c) The patients did not have to wait for operations and in addition the load on the hospital inpatient and outpatient service was reduced

d) Most patients following general anaesthetic were back at work albeit light duties 48 hours after operation follow up revealing that no patient was unable to cope with the duties to which he was returned Time off work was therefore greatly reduced compared with a hospital admission

e) No ship in the groups with which *HMS Royal* was to company had to divert from their operational task to land any surgical emergency during the 18 months *HMS Royal* acted as the referral centre at sea and any patients who required further hospitalisation were either repatriated when the ship arrived at a scheduled port of call or flown ashore by helicopter

The disadvantages of this policy are if complications arise, that there is not the comprehensive back up that is available in a hospital This was particularly the case where the anaesthetist was concerned There was no consultant cover in case of anaesthetic complication The most likely potential complications include anaphylactic reaction failed intubation arrhythmias and malignant hyperpyrexia However full resuscitation equipment was

available including a defibrillator Dantrolene was the only emergency drug not available on board. A full history and examination were carried out prior to surgery and any risk factors elicited precluded that patient undergoing routine surgery

In these days of a litigation conscious public it must be assumed that such a policy can only be acceptable to the authorities such as the defence societies and the MOD if it is shown to be successful and the benefits far outweigh the recognisable risks

The results obtained in terms of morbidity and mortality (no patient died) indicate that the policy was successful There is no doubt in our minds that the patients preferred to have their surgical problems resolved at sea for several reasons Namely they did not have to wait for admission their families were not affected by the inevitable disturbances that accompany a loved one being admitted to hospital and they were removed from their work for the minimum possible time

It must be added that the policy had the support of the "managers" as they were returned a fit worker with minimum disruption to their departments

However is acceptability measured in terms of the "cover" provided by the professional authorities? If it was felt that routine surgery in an aircraft carrier should not be performed with a general anaesthetic without consultant cover immediately at hand in contrast to the situation required in a hospital in the United Kingdom then this argument might have to be extended to include RNH Gibraltar It would also bring into question the necessity for hospital specialists on board aircraft carriers If routine operating is deemed unacceptable in these terms then surely emergency surgery should be avoided at all costs unless it is life or limb saving

It must be borne in mind that emergency surgery fraught with hazard at the best of times is the more so at sea even on the relatively stable platform of an aircraft carrier To attempt it with an out of practice team with untested equipment, unproven techniques and unrehearsed routines can only greatly increase the risks involved

CONCLUSION

Our results suggest that routine surgery and anaesthesia at sea in an aircraft carrier on a preselected group of basically healthy males with no known risk factors is safe We believe that the risk of complications is small and that the advantages of our policy significantly outweigh the risks

The question remains however if the rationale for such a policy is accepted as being justified of the support that would be provided by a defence society or the MOD in the case of litigation being brought against the non consultant specialist be he the surgeon or the anaesthetist

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NBCI—Another threat to Operational Effectiveness?

E. P. Dewar, R. B. Taylor, J. Jones and D. A. Hett

Abstract

Battle casualties are well recognised as a threat to Operational Effectiveness (OE) at times of conflict. Less well appreciated is that naturally occurring illnesses and injuries—Non Battle Casualties and Injuries (NBCI)—continue to present at such times and will add to the problems of fighting the ship. This prospective study showed that NBCI resulted in a total of 1369 man days of lost personnel effectiveness among some 1738 RN servicemen during a 180 day deployment. That is just 0.42% of the possible man working days. This represents a loss of 4.3 man days per 1000 at risk per day in terms of fitness for Full Duties or 2.74/1000/day excluding those able to perform Light Duties. It is unlikely that such rates would affect the OE of the fighting units but they do represent a significant challenge to the Royal Naval Medical Service to continue to maintain the rates at such low levels so that when aggregated to the numbers of battle casualties OE is maintained as far as possible.

INTRODUCTION

Nuclear Biological and Chemical warfare is a well recognised and assessed concept for which countermeasures (NBCD) have been introduced to reduce its threat to the OE of men and material. The inevitable battle casualty toll as a result of conflict is also well recognised and has been assessed by analysis of actual casualty rates in war and the use of various casualty models. Non-Battle Casualties and Illnesses (NBCI) that is the naturally occurring injuries and illnesses provide yet another factor which has the potential to affect the OE of the Fleet in terms of its most important asset the highly trained sailor. These afflictions will continue to happen during conflict and may even be exacerbated by the environmental conditions prevailing at such times.

To date there has not been a formal prospective study to measure the extent to which NBCI poses a problem in a Task Group of RN ships at sea away from their base port for a prolonged period. The present study was carried out to determine in a quantitative manner the effect of naturally occurring illness and injury on the personnel effectiveness of the ships' companies during a 6 month group deployment away from the UK.

PATIENTS and METHODS

A computerised Data Collection Form (DCF) was designed on which were recorded the demographic details of all the patients who required to be removed from duty or placed on Light Duties for a period longer than 24 hours. The duration of time away from duty was recorded along with the diagnosis.

The DCFs were filled in on a daily basis immediately after the patient had initially been seen and upon review.

The forms were issued to the ships HMS *Ark Royal* HMS *Edinburgh* and HMS *Sirius* all of which carried medical officers with prior instruction on their correct and detailed completion. The data were collected for all three ships for the six months of the deployment—OUT BACK 88—from mid June to mid December.

Surgeon Commander Dewar is Head of Surgery at Royal Naval Hospital Plymouth. CPOMA Taylor is serving in HMS *Daedalus* and Surgeon Lieutenant Commander Hatt is currently appointed to Royal Naval Hospital, Haslar.

At the end of each month the forms were collected and collated in *Ark Royal*

The periods when the servicemen were unfit for duty were categorised into Light Duty Stand Off admission to the Sick Bay or Casevac/admission to Hospital All data were tabulated for each ship and each specialty department within the ship The results were expressed as man days of lost personnel effectiveness for each category and also as the N8CI rate per 1000 people at risk per day using the formula

$$N8CI = \frac{n \times 1000}{d \times s}$$

where n = number of man days lost, d = length of deployment in days and s = average number of ship's company This allowed comparison between the various sized ships companies and the calculation of means

For those patients admitted to hospital the time away from duty was calculated until they were discharged and returned to the ship or discharged in a reduced medical category that precluded their return to sea going duty It was not possible to take account of the time taken for a replacement to be drafted to the ship in those cases remaining in a reduced category during which time the job would have been gapped

Those patients from HMS *Edinburgh* and HMS *Sirius* who could not be managed in their own sick bays and were consequently admitted to the better equipped sick bay in *Ark Royal* were included in their individual ship s returns as having been admitted to hospital This would have had to be the case if the ships had not been in company and accounts for the relatively small numbers in the sick bay category from the smaller ships

RESULTS

The OUTBACK 88 deployment lasted 180 days and involved a total of 1738 servicemen based upon the average numbers borne in each ship 250 288 and 1200 for HMS *Sirius* HMS *Edinburgh* and HMS *Ark Royal* respectively

Tables 1 2 and *3* show the numbers of man days of lost personnel effectiveness in each ship by department expressed in terms of the category of unfitness from Light Duties through to Casevac or Hospital admission, where the patient was unable to perform Full Duties for a minimum period of 24 hours

For clarity the Regulators and PT branch are included in the Operations department figures in all three ships In the two smaller ships the Medical personnel are incorporated in the S&S figures. The totals for each department in the brackets comprise the usual members of the department plus trainees plus augmentees, of which there were several during the deployment.

Table 4 expresses the results of man days of lost personnel effectiveness in terms of percentages of the total man days of the whole period of the deployment The percentage man days lost for all categories of unfitness are shown alongside those for the combined categories of Stand Off Sick Bay and Casevac/Hospital but excluding Light Duties These latter results represent the more realistic rates because those on Light Duties would be able to perform some effective duties

All the percentages are low and the range of results is small Only two departments have rates above 0 7% 801 Sqn and 849B Flight in *Ark Royal* These are explained by the fact that one pilot in 801 Sqn suffered a fractured femur and as an individual added considerably to their Sick Bay and Casevac/Hospital categories In 849B Flight two pilots spent prolonged

Table 1 HMS *Sirius* Man days of lost personnel effectiveness by category and department

	(n)	Light Duties	Stand Off	Sick Bay	Casevac/Hospital	Total
ME	(62)	26	26	0	8	60
WE	(44)	13	6	0	12	31
OPS/COMMS	(99)	14	11	0	0	25
S&S	(36)	19	3	3	0	25
AIR	(9)	3	2	0	2	7
Total	(250)	72	48	3	22	145

(n) = total number in each department including trainees

Table 2 HMS Edinburgh Man days of lost personnel effectiveness by category and department

	(n)	Light Duties	Stand Off	Sick Bay	Casevac/Hospital	Total
ME	(69)	19	6	0	55	80
WE	(62)	37	11	1	18	67
OPS/COMMS	(109)	17	11	18	41	87
S&S	(39)	11	4	0	32	47
AIR	(9)	0	0	7	0	7
Total	(288)	84	32	26	146	288

(n) = total number in each department including trainees

Table 3 HMS Ark Royal Man days of lost personnel effectiveness by category and department

	(n)	Light Duties	Stand Off	Sick Bay	Casevac/Hospital	Total
ME	(188)	30	13	29	24	96
WE	(82)	23	1	32	0	56
OPS/COMMS	(207)	78	13	87	6	184
S&S	(131)	6	18	32	13	69
MED	(13)	3	1	2	0	6
AIR/AED	(121)	7	4	25	0	36
801 Sqn	(118)	31	0	36	99	166
820 Sqn	(211)	81	26	56	8	171
8493	(57)	95	6	8	34	143
845 Sqn	(60)	7	1	0	0	8
MNES	(12)	0	0	1	0	1
Total	(1200)	361	83	308	184	936

(n) = total number in each department including trainees

periods in Light Duties one with a perforated tympanic membrane the other with enteritis. This elevated the All Categories rate to 1·39% but when the Light Duty category is excluded the rate falls markedly to 0·47%.

There is otherwise no indication that any department is more susceptible to illness or injury. The mean values for each ship *Sirius* 0·32% *Edinburgh* 0·55% and *Ark Royal* 0·43% for All Categories are low and when again those in Light Duties are not included the respective values of 0·16% 0·39% and 0·27% are very low. The operational capability was not significantly affected in any department of any of the 3 ships.

Table 5 shows the inability to perform Full Duties in terms of NBCI rates man days per 1000 at risk per day in each ship by category of unfitness. The rates of Light Duties are remarkably similar in all three ships and constitute the highest proportion of all categories apart from *Edinburgh*'s Casevac/Hospital category. HMS *Edinburgh* appeared to have a high proportion of man days to hospital mainly because the conditions with which the patients presented eg. Hepatitis B alcohol dependence psychiatric instability penetrating eye injury and prolapsed intervertebral disc of necessity required prolonged periods of downgrading rather than any particular episodes of illness or pattern of injury that differed from the other two ships.

Finally *Table 6* demonstrates the overall NBCI rates from all three ships and highlights the low rate of 2·7 man days per 1000 at risk per day in those unable to perform any duty at all when the 1·6/1000/day who could perform Light Duties are excluded.

DISCUSSION

In any study of this type it is appreciated that it is difficult to simulate the war time environment. It is well recognised that the stress of exercise conditions does not equate to that of conflict. However using a repeatedly exercising Task Group away from home for a prolonged period does as nearly as possible in peacetime,

Table 4 Rates of lost personnel effectiveness by department and ship expressed in percentages of total possible man days

	SIRIUS		EDINBURGH		ARK ROYAL	
	All Categories	Categories excluding Light Duties	All Categories	Categories excluding Light Duties	All Categories	Categories excluding Light Duties
ME	0 53	0 30	0 54	0 49	0 28	0 19
WE	0 39	0 22	0 50	0 27	0 38	0 22
OPS	0 14	0 06	0 44	0 36	0 49	0 28
S&S	0 38	0 09	0 67	0 51	0 29	0 27
AIR/AED	0 43	0 25	0 43	0 43	0 18	0 13
MED					0 25	0 13
801 Sqn					0 78	0 63
820 Sqn					0 45	0 24
849B					1 39	0 47
845 Sqn					0 07	0 01
MNES					0 05	0 05

Table 5 NBCI Rates Man days lost per 1000 at risk per day by category and ship

	Light Duties	Stand Off	Sick Bay	Casevac/Hospital
SIRIUS	1 6	1 08	0 07	0 49
EDINBURGH	1 8	0 62	0 5	2 82
ARK ROYAL	1 67	0 38	1 4	0 85
Mean	1 62	0 69	0 85	1 38

Table 6 NBCI Rates Man days lost per 1000 at risk per day by ship for all categories + Light Duties

	All Categories	Categories excluding Light Duties
SIRIUS	3 2	1 6
EDINBURGH	5 5	3 9
ARK ROYAL	4 3	2 6
Mean	4 3	2 7

recreate some of the environmental effects on the servicemen

The tension of conflict undoubtedly does affect the rate of reporting sick However this is known to be both positive—increased illness because of stress and negative—fewer reporting sick because the desire not to let the side down It is not possible to account for these kinds of confounding factors in designing such a study but it may be to a great extent that they balance each other out with the result that the possible differences are insignificant Similarly whilst a wartime task group is likely to spend less time in port than a peacetime deployment the mere fact of being ashore may well increase the serviceman's susceptibility to illness and injury—be it self induced or not[1]

There is no reason to believe that the OUT BACK [88] deployment experienced any more or less exposure to conditions likely to affect personnel health than any other and it is gratifying that the results of the study demonstrate such low rates of time spent away from duty It would be interesting to compare the deployment figures with those from a short establishment covering such a wide diversity of operational tasks. Undoubtedly the high proportion of Light Duties time results from the fact that the patients remain in such close proximity to medical facilities on board and the medical teams have both easier access to and greater influence over their shipmate patients than is the case ashore It is easier to keep an eye on them and there is less inclination to remove

them completely from any form of duty The figures reported did not significantly affect the OE of any of the ships though there were a few occasions when critical people were unfit and required a shuffling of personnel to enable their duties to be completed This was particularly apparent during prolonged exercise periods in low density watch keeping rosters

There can be little doubt that without the medical resources provided to the Task Group the number of man days lost and the NBCI rates would have been considerably higher This would particularly have been the case if there had not been the facility for carrying out emergency and urgent necessary surgery on board the CVSG

At no time did any of the ships have to alter their programme to land an ill serviceman and as over 100 operations were carried out, 40% under general anaesthetic it is unlikely that this would have been the case without such adequate medical provision The rates of NBCI when added to those battle casualties at times of conflict could sway the balance between being fully operationally effective or not It is because of this although our results demonstrate that the Medical Service does maintain a low attrition rate that accurate and up to data NBCI rates should be included in the figures used for the logistical planning for the management of casualties Such people are just as much patients as those affected directly by the battle situation and will continue to present to the medical facility requiring care and affecting the overall running of the ships The NBCIs need to be returned to fitness as do the battle casualties and indeed because in the majority of cases their severity of illness or injury will likely be less than that of the battle casualty it is the former who we are going to be able to return to Full Duty in a shorter time and thus be able to make a further contribution to fighting the ship

The actual kinds of illness and injury that afflicted the servicemen on this particular deployment were of the diverse nature that would be expected and were not biased by the particular conditions of the deployment Their wide variety and quantity preclude reporting them individually though the information is available but the intent of this report of the study was to concentrate on rates of unfitness for duty as they actually occurred rather than to analyse causation. It is believed that our results are representative quantitatively and present as accurate a picture as it is possible to create of the situation that prevails at present at sea

The overall man days of personnel effectiveness (unfit for Full Duty) are gratifying few and the NBCI rates are being maintained at low levels by the ability of the medical teams to return patients to duty early as a result of the medical resources and skills provided to the Fleet

On its own in normal circumstances NBCI should not pose a threat to Operational Effectiveness, but its impact at a time of conflict must not be forgotten or ignored

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Journal of the Royal Naval Medical Service
75th Anniversary

By now subscribers should have received a facsimile copy of the first issue of the Journal of the Royal Naval Medical Service published in January 1915. The Editorial Committee of the Journal has chosen to celebrate the 75th Anniversary by this method and is indebted to Messrs Smith Kline and French for making it possible.

Additional copies are available free of charge from the **Editorial Secretary, Journal of the Royal Naval Medical Service**, Monckton House, Institute of Naval Medicine, Alverstoke, Gosport, Hants PO12 2DL.

J roy nav med Serv 1990 76 89–95

The Effect of Clothing on the initial Responses to Cold Water Immersion in man

M J Tipton, D. A. Stubbs and D H Elliott

Abstract

The protection provided by three clothing assemblies against the cold shock response was investigated. Nine healthy male volunteers each undertook three two minute head out immersions into stirred water at 10°C. The subjects wore a different clothing assembly for each immersion these were:

a) Swimming trunks only

b) Conventional clothing (equivalent to RN No 8s)

c) Conventional clothing plus windproof/shower proof clothing (RN foul weather clothing Mk III)

The cardiac ventilatory and thermal responses of the subjects were examined before and during the immersions.

No significant differences were found between the magnitude of the responses recorded on immersion when conventional clothing or foul weather clothing were worn. Mean skin temperature was lower ($P<0.05$) and respiratory frequency and minute ventilation were higher ($P<0.05$) on immersion in swimming trunks compared to the other two conditions.

It is concluded that when policies for the use of immersion protective clothing are being formulated consideration should be given to all of the potentially hazardous responses associated with cold water immersion.

INTRODUCTION

The initial responses to immersion in cold water include an uncontrollable 'inspiratory gasp' hyperventilation tachycardia peripheral vasoconstriction and hypertension[1–3]. These responses given the generic title of the cold shock response" are probably responsible for the majority of the 400–1000 open water immersion deaths which occur in the UK each year[4,5].

For individuals with pre existing hypertension or coronary heart disease the cardiovascular responses may be particularly hazardous. For healthy individuals it is the respiratory responses which represent the major threat, preventing the conscious cessation of breathing at a time when it is most needed. Several authors have reported that immersion in cold water significantly decreases the maximum breath hold time of subjects[6,7]. In the study of Tipton & Vincent[7] the average maximal breath hold time of 18 normally clothed subjects fell from 45 seconds in air to 9.5 seconds on submersion in water at 5°C.

Although normal clothing has been reported to attenuate the cold shock response[2,8] it can still reach potentially hazardous levels in some individuals[7]. Whilst the protection provided by specialist clothing such as immersion 'dry' suits can be good[7] that provided by clothing between the extremes of normal and dry suits is either unknown or has been shown to be poor[7]. Knowledge of the protection afforded by different clothing assemblies against the cold shock response is important if effective protection is to be provided against all of the hazardous responses associated with immersion in cold water.

The aim of the present experiment was to examine the protection provided against the cold shock response by normal clothing with and without supplementary windproof/shower proof foul weather gear.

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METHODS

The experimental protocol was approved by a

local ethical committee prior to subject recruitment

Subjects Nine healthy male volunteers aged between 20 and 35 years of age acted as subjects for the experiment Following a full medical examination which included a 12 lead electrocardiogram (ECG) and before giving his written consent to participate each subject was fully informed about the nature of the experiment and the potential risks by an independent physician

Protocol Each subject performed three two minute head-out immersions into stirred water at a temperature of 10°C The subjects wore a different clothing assembly for each immersion these assemblies were

a Swimming trunks (ST)

b Conventional clothing (CC)—polyester/cotton shirt and trousers, shoes socks and underpants (equivalent to RN No 8s)

c Foul weather clothing (FWC)—conventional clothing described above plus polyurethane coated woven nylon rain/windproof jacket and trousers (RN foul weather clothing Mk III)

A repeated measures Latin Square experimental design was employed in which the nine subjects were all exposed to each of the conditions once At least a week was left between the successive immersions of each subject and the subjects undertook all of their immersions at the same time of day The subjects rested and did not smoke eat or consume caffeinated or alcoholic drinks for at least two hours before immersion

Each immersion was preceded by a ten minute period in air at thermoneutral temperatures during which the subjects were seated at rest on the chair on which they were to be immersed At the end of the pre immersion period they were lowered into the water at a reproducible rate ($0.1^{-0.2}$ m s^{-1}) by an electric winch attached to the chair They were immersed to the level of the laryngeal prominence and remained in the same seated posture throughout each experiment

The subjects were instructed to take a slightly larger than normal breath in and hold their breath for as long as possible when the water level reached the neck At the rate at which the electric winch lowered the subjects breath holding should have begun 5 5 seconds after the start of the immersion Following their breath-holds the subjects breathed freely for the rest of the immersion After each immersion they were removed from the cold water and rewarmed in a bath containing water at a temperature of 40°C

Experimental measures The subjects remained on a mouthpiece (Spirotechnique France) throughout each experiment The volume of expired air was determined by evacuating Douglas bags attached to the expiratory side of the mouthpiece assembly through a dry gas meter (Harvard Instruments USA) which gave a digital read out of volume accurate to 0 1 litre Douglas bags were collected for the first three minutes of the rest period and during immersion The concentration of oxygen and carbon dioxide in mixed expired air was analysed (OM11 & LB2 analysers Beckman II USA) and oxygen consumption calculated The fractional concentration of end-tidal carbon dioxide was measured by continuously sampling expired air at the mouthpiece and analysing for carbon dioxide concentration (LB2 analyser Beckman II USA)

The expiratory volumes collected in the Douglas bags could be checked after appropriate corrections against those obtained from a pneumotachograph and integrator unit (P K Morgan Kent UK) through which the subjects inhaled. Inspiratory volume respiratory frequency and breath-hold time were also obtained from the pneumotachograph A 3-lead ECG was obtained from each subject throughout each immersion (Tektronix 408 Monitor Beaverton USA). Heart rate was determined from the ECG

Skin temperatures were measured using thermistors (EU Thermistor Grants Instruments Cambridge UK) attached to the skin by single pieces of waterproof tape at the following sites forehead chest abdomen forearm back of hand lower back and calf Mean skin temperature was calculated by an unweighted division of the sum of the seven skin temperatures

The leads from the monitoring sensors exited the clothing at the neck The ECG and respiratory variables where recorded continuously throughout each experiment on a six channel direct writing recorder (Gould 2600S Gould Electronics, Ilford UK) The skin air and water temperatures were recorded every 30 seconds throughout each experiment using a data logger (Squirrel data logger Grants Instruments Cambridge UK) Maximum breath hold time was measured on immersion and during the first five minutes of the pre immersion period

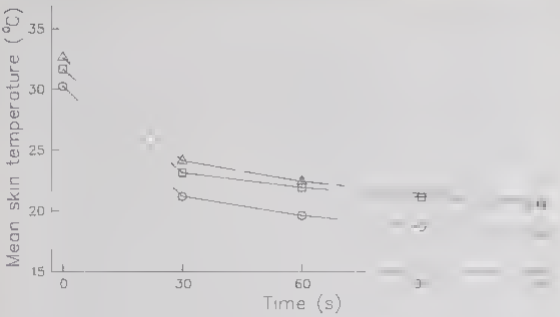


Fig. 1. Mean skin temperature (°C) just before and during immersion. ○ = ST, □ = CC, △ = FWC ($n = 3$).

Statistical analysis

An analysis of variance was used to examine the data obtained from the Latin Square design. The interaction of the main factors of sequence of immersions, week, clothing and time was investigated and significantly different time profiles between suits were examined using Scheffés method of multiple comparison.

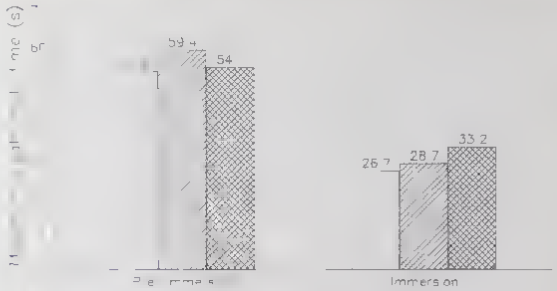
RESULTS

Unless stated otherwise, results are quoted at the 5% level of significance for a subject number of nine. There were no significant differences between conditions in the variables recorded during the pre-immersion period with the exception of the skin temperatures of the forehead, chest, abdomen and calf which were found to be cooler in the ST than in the other two clothing assemblies.

The skin temperature sites were chosen to give an indication of water leakage into the clothing assemblies rather than an accurate estimation of actual mean skin temperature. The calculated mean skin temperatures in each of the conditions is shown in *Fig. 1*. This was lower in the ST on immersion than in the other conditions, which did not differ significantly. The rates of change of mean skin temperature (°C.s^{-1}) over the first 30 seconds of immersion were 0.301 in ST, 0.284 in CC and 0.282 in FWC. The faster rate of fall of temperature in ST compared to the other two conditions was due to slower rates of change of temperature at the skin sites covered by clothing in the CC and FWC conditions. There were no differences between the rates of change of mean skin temperature recorded in the two clothed conditions.

The breath hold time results are presented in *Fig. 2*. Maximal breath-hold time fell on immersion in all conditions but did not differ between conditions although the times recorded in FWC did tend to be slightly longer than those recorded in the other two conditions. The time to begin breath-holding on immersion did not vary between conditions and averaged 5 seconds. Minute ventilation increased on immersion in all conditions despite the fact that breath-holds were performed. Ventilation was significantly higher during the first and second minutes of immersion in ST than the other clothing conditions between which ventilation did not differ. The mean ventilatory volumes recorded during the immersion and pre-immersion periods are shown in *Table 1*.

Only the increase in respiratory frequency on immersion in ST was found to be statistically significant (*Fig. 3*). The increase in ventilation on immersion resulted in significant reductions in the partial pressure of end tidal carbon dioxide in all conditions. The reductions observed in ST (average reduction 0.96 kPa) tended to be greater than those seen in CC



Average maximum breath hold times(s) before and on immersion ☐=ST ▨=CC ▩=FWC (n=9)

(average reduction 0 82 kPa) and FWC (average reduction 0 74 kPa). End tidal levels of carbon dioxide were lower following breath holding in water (5 24 kPa averaged across conditions) than in air (5 69 kPa averaged across conditions) and did not differ between conditions.

The oxygen consumption of subjects in creased in all conditions on immersion (*Fig 4*). The increases observed in ST tended to be higher than those seen in the other two conditions in which the increases did not differ.

Heart rate increased in all conditions between the 5th and last minute of rest and did not then increase significantly on immersion

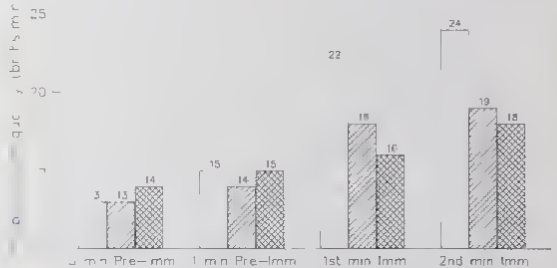


Fig 3 Average respiratory frequency (births min⁻¹) before and during immersion ☐=ST ▨=CC ▩=FWC (n=9)

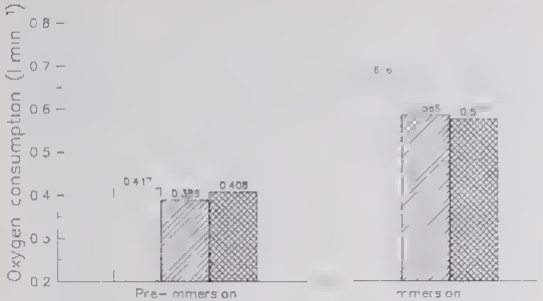


Fig 4 Average oxygen consumption (l min^{-1}) before and during immersion □=ST ▨ CC ▩=FWC (n=9)

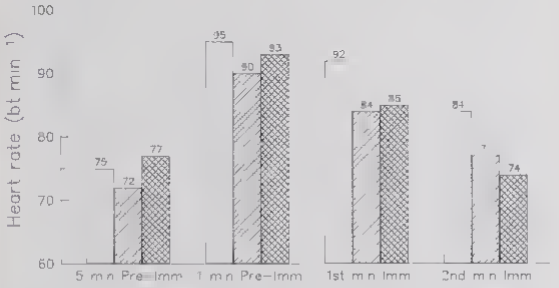


Fig 5 Average heart rate (bt min^{-1}) before and during immersion □=ST ▨ CC ▩=FWC (n=9)

(*Fig 5*) There were no differences between conditions in the heart rates recorded on immersion but the rates tended to be higher in ST than the other two conditions

DISCUSSION

The cold shock response is thought to be evoked by rapid falls in skin temperature[29] In the present study such falls occurred on immersion in each condition with the fastest average rate of fall occurring in ST The similarities in the rates of change of skin temperature in the two clothed conditions suggests that the FWC did little to reduce the rate of water ingress beneath

the underclothing and, as a consequence the magnitude of the responses evoked were similar to those recorded in CC

Table 1 Ventilatory volumes (l min $^{-1}$) in each condition during the last minute of the pre immersion period (IMM − 1) and the first and second minutes of immersion (IMM 1 and IMM 2)

TIME	SUIT ST	CC	FWC
IMM − 1	16 4	15 4	14 4
IMM 1	31 0	25 0	21 9
IMM 2	32 0	24 9	22 0

The results of the present investigation indicate that whilst normal clothing may attenuate the initial responses to some extent little extra protection is provided against these responses by the addition of windproof/showerproof clothing. The variability in the response between individuals is large however and it can reach hazardous levels in some individuals even when they are wearing protective clothing.[10] In the present study the maximal breath hold time on immersion of four of the subjects wearing the FWC was below ten seconds.

In addition after immersion to the neck in all of the conditions an average period of three seconds elapsed before subjects were able to control their breathing to an extent that allowed them to begin breath-holding. It is this period when respiration is out of control that would be most hazardous in an accidental immersion especially if during that period the victim is submerged in a sinking craft or periodically submerged by wave splash

The lower end tidal partial pressures of carbon dioxide recorded in all conditions after breath-holding in water compared to air suggest that the shorter breath hold times observed on immersion were not due to chemical factors The reduction in breath hold time averaged 47% across all conditions and was most probably caused by the increased respiratory drive evoked by skin cooling [1] The fall in the end-tidal partial pressure of carbon dioxide during the immersions reveals that the increases in ventilation which occurred were due to hyperventilation rather than hyperpnoea The risks associated with such hyperventilation have been described previously and include disorientation and tetany [11]

Although sudden unexpected immersion in cold water produces a significant tachycardia the findings of the present study confirm those of earlier work[12] which have demonstrated that when individuals are aware that they are about to be immersed in cold water heart rate may be increased before immersion due to anxiety and as a consequence not increase on immersion

From a practical point of view the results of the present investigation have significant implications for the level of protection provided for individuals at risk of immersion in cold water and the policies for the use of that protection. Despite the fact that the cold shock response probably represents a greater threat to the life of a cold immersed individual than hypothermia many clothing policies are based solely on the threat from hypothermia

Such policies can be potentially dangerous in situations such as short term immersion where hypothermia is not thought to be a threat In such situations effective protective clothing may be replaced by garments which provide little protection against the cold shock response despite the fact that the threat from this response remains as great and is unrelated to the time period of immersion

It is concluded that when policies for the use of immersion protective clothing are being formulated consideration should be given to all of the potentially hazardous responses associated with immersion in cold water and not just those resulting in a fall in core temperature In situations where it will be impractical to provide full protective clothing, other methods of attenuating the cold shock response such as cold habituation[13] and high levels of physical fitness[14] should be considered

ACKNOWLEDGEMENTS

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A Pilot Trial of treatment of Acute Inversion Sprains to the ankle by ankle supports

P I Milford and P J Dunleavy

Abstract
A simple study is described which suggests that the Aircast bracing system may usefully shorten recovery time from severe ankle sprains in military personnel

INTRODUCTION

TREATMENT of the inversion injury to the ankle arouses controversy especially when the injury is severe involving suspected instability of the ankle mortice and inability to weight bear

When treating minor ankle inversion injuries the main aim is to reduce pain and swelling and promote normal function as efficiently as possible using various strapping and bandages However, uncertainty still exists on the optimum policy for the length of immobilisation of a severe ankle sprain Conventionally the treatment used is plaster of paris (POP) cast The period of immobilisation could cause fibrotic stiffness in the ankle joint Jackson[1] in a report on West Point Cadets treated in POP for ankle sprains concluded that their functional recovery was prolonged by the approximate number of days spent in the cast

The ideal solution would be treatment for the sprained ankle that involved protecting the soft tissues from re-injury while permitting normal function of the uninjured structures A trial was mounted to assess if the Aircast ankle support fulfilled these requirements

MATERIALS AND METHODS

The trial involved 60 otherwise healthy Royal Marine recruits with acute ankle inversion injuries All patients entered the study within 24 hours of injury

All patients were examined by a Medical Officer on the day of injury and the injured ankle was X rayed (Anterior/Posterior Lateral and stress "Anterior drawer" views) to exclude fractures or complete diastasis of the inferior tibio-fibular joint

The injuries examined were graded according to the severity of sprain based on O Donoghue[1] as follows

GRADE I — No loss of function of the lateral ligament Mild swelling and pain over the injured area Full weight bearing is possible

GRADE II — Part of the lateral ligament is torn but there is no instability Diffuse tenderness and swelling of the ankle Weight bearing is painful

GRADE III — Major trauma with complete rupture of one or more parts of the lateral ligament There is impairment of function and a degree of instability of the ankle joint making weight bearing almost impossible

Patients were excluded if there was any clinical evidence of significant injury to the soft tissue structures other than the lateral ligament complex eg Achilles tendon rupture peroneal tendon dislocation

Allocation of treatment was based on a systematic approach providing alternate patients within each severity grade conventional or Aircast treatment as per *Table 1*

Material for conventional mode treatment consisted of elastoplast bandage/zinc oxide

At the time of writing both authors were serving at the Commando Training Centre Royal Marines Lympstone MTI (P) Milford has now left the Royal Navy and MTI (P) Dunleavy is at Royal Naval Hospital Gibraltar

Table 1 Numbers of patients treated

	Aircast brace	Conventional treatment
Grade I sprain	10	10
Grade II sprain	16	16
Grade III sprain	04	04
TOTAL	30	30

strapping with plaster of paris (POP) for the severe sprains. The Aircast pneumatic brace supports the lower leg and ankle with an outer plastic shell lined with inflatable airsacs (preset at 25 mmHg pressure). The injured ankle is protected laterally/medially preventing re injury, whilst promoting functional movements of dorsiflexion/plantar flexion. When weight bearing the airsacs exert an alternating pneumatic pressure which compresses the soft tissues reducing swelling and oedema.

Three types of brace were used:

1) Aircast Walking Brace enclosing foot to upper $\frac{1}{3}$ tibia (*Fig.* A)
2) Aircast Standard Brace supports ankle to mid tibia (*Fig.* B)
3) Aircast Training Brace 25% smaller than Standard Brace (*Fig.* C)

Both Standard and Training braces will fit inside footwear.



Fig. A



Fig. B



Fig. C

Treatment for patients was daily from Monday to Friday. For patients with Grade I and II injuries conventional strapping or Aircast support was removed for each treatment then reapplied on completion. Grade III injuries treated conventionally with below knee weight bearing POP could not start treatment for two weeks whereas those using the Aircast Walking Brace could participate immediately in the physiotherapy modes as applied to Grade I and II. The initial 48 hours of treatment consisted of ice packs, elevation and support (as above). Ambulation on crutches partial or non weight bearing, started at the earliest opportunity progressing to contrast bathing, ultrasound and passive/active mobilisation of the ankle working towards strengthening regimes especially of the evertor muscle groups. Swimming sessions were also included at this stage. When weight bearing was possible proprioceptive training and gait re-education were employed using the wobble board, mini trampette and parallel bars. On achieving full ankle movement and sufficient muscle power/co ordination to run 400 metres and complete grid sprints pain free the patient returned to full function/training. The period between injury and achieving this goal and the number of treatment attendances was recorded for each patient.

RESULTS

There were 30 patients in each of the two treatment groups. Their distribution between Grades of sprain is shown in *Table 1*. In view of the small number of patients in each sub-group it was considered inappropriate to subject the data to formal statistical analysis.

Table 2 Mean number of treatment attendances per patient

	Aircast brace	Conventional treatment
Grade I sprain	4·9	6·8
Grade II sprain	14·4	14·9
Grade III sprain	18·6	25*

(*Treatment began after 2 weeks in POP cast)

Little was gained in respect of number of attendances for treatment (*Table 2*) or time to full recovery (*Table 3*) by using the Aircast brace in the treatment of Grade I or II sprains. In contrast the small group with Grade III sprains treated with Aircast brace required on average 6·4 (Range 5·8 to 7·9) fewer attendances and 23·8 days (Range 20·3 to 27·8) less off duty than those with such injuries treated conventionally.

Table 3 Mean number of days from injury of ankle to recovery

	Aircast brace	Conventional treatment
Grade I sprain	7·8	9·2
Grade II sprain	22·6	23·7
Grade III sprain	29·8	53·6

DISCUSSION

Ideally comparisons of treatment regimes should be made on a double blind basis to reduce the risks of bias. Such an approach is impossible in investigations such as this where the critical differences in treatment are so apparent that neither patient nor the investigator could remain unaware of them. Mindful of the need to eliminate observer and subject bias as far as possible recovery end points were defined in terms of ability to carry out without pain real training tasks which tested the integrity of the ankle joint (400 metre run and grid sprints) rather than being restricted to clinical observations of pain-free range of movement.

The small numbers of patients require the results to be interpreted with caution. While recovery of Grade I and II sprains does not appear to be hastened by the Aircast brace there is clearly no recovery disadvantage related to using it in the treatment of such injuries and it has the advantage of sparing the patient the discomfort of wearing elastoplast bandage or zinc oxide strapping and having this removed repeatedly for treatment.

Within the limits of the study numbers the Aircast brace does appear to offer opportunities for significant savings to be made in both staff time and lost duty/training time for patients and it is concluded and recommended that further studies be mounted. These studies

should include examination of the useful life span of Aircast braces so that meaningful comparisons of costs can be included in the final analysis

ACKNOWLEDGEMENTS

We would like to thank Surgeon Commander Riddell CTC RM LYMPSTONE and Surgeon Commander Macleod RNH Haslar for their advice and guidance in carrying out this study

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Varicose Veins: optimum compression after surgery and sclerotherapy

P J Shouler and P C Runchman

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Summary

Graduated compression stockings are used in both surgical and non surgical treatment of varicose veins In a limit of high versus low compression stockings (40mmHg vs 15mmHg at ankle) after varicose vein surgery both were equally effective in controlling bruising and thrombophlebitis but low compression stockings proved to be more comfortable

In a further trial after sclerotherapy high compression stockings alone produced comparable results to Elastocrepe® bandages with stockings It is concluded that after varicose vein surgery low compression stockings provide adequate support for the leg and that after sclerotherapy bandaging is not required if a high compression stocking is used

INTRODUCTION

Graduated compression stockings are used widely in the management of varicose veins Alone they can produce relief of symptoms to the extent that no additional treatment may be required [1] Stockings or bandages are recommended after surgery to reduce bruising and thrombophlebitis [2] and compression is applied after sclerotherapy to occlude the superficial vein lumen [3] The compression pressures produced by bandages are dependent upon the surgeons applying them[4] and fall rapidly with time [5]

Graduated compression stockings have significant physiological benefits on venous function[6] and probably produce more uniform and sustained pressure than bandages

A trial was conducted to compare the use of a stocking producing 15mmHg compression at the ankle (provided by Bievet Hospital Products Reading, UK) with one producing 44mmHg compression (Bievet Varex®) after varicose vein surgery In a further trial the use of high compression stockings alone was compared with a combination of high compression stockings plus bandages after sclerotherapy

All stockings were tested by the manufacturer using the Hatra method to conform to the British Standard (BS 6612 85)

PATIENTS AND METHODS

Patients referred to the varicose vein clinic were considered for entry into the trial Those with saphenofemoral or saphenopopliteal incompetence (as demonstrated clinically by Trendelenburg or tourniquet tests) were treated by flush ligation of the saphenofemoral and saphenopopliteal junction respectively Prominent superficial perforating veins were removed by local avulsions Some patients with high thigh perforating veins considered unsuitable for sclerotherapy were treated by local avulsions Immediately after surgery crepe bandages were firmly applied from toes to mid-thigh They were removed the next morning and replaced with either high or low compression stockings Patients were discharged the day after surgery and instructed to wear the stocking continuously for 10 days, until the sutures

At the time of writing, both authors were appointed to Royal Naval Hospital Haslar Surgeon Commander Shouler has now retired from the Royal Navy Surgeon Commander Runchman is Principal Medical Officer HMS *Invincible*

were removed and then during the day for a further four weeks until review

Patients with no evidence of saphenofemoral or saphenopopliteal incompetence and some with residual varices following previous surgery were treated by sclerotherapy Up to six injections of sodium tetradecyl sulphate (STD) were made into each leg at each treatment session at the site of local incompetent varices with the leg elevated Sorbo-rubber pads were applied at the injection sites and secured with non irritant tape Patients were then randomised to receive either an Elastocrepe® bandage with a high compression stocking or high compression stockings only Patients were instructed not to remove the compression until reviewed At interim review after three weeks the compression was removed and the leg inspected to see if further injections were required The same compression was then re applied for a further three weeks without the pads

Randomisation in both groups was by numbered sealed envelopes attached to data collection proformas The results of treatment were assessed at six weeks when patients were asked whether the compression had been uncomfortable removed or had slipped down The presence of significant thrombophlebitis was noted and the results of treatment were assessed jointly by surgeon and patient Patients were assessed and treated by the consultant in charge of the clinic or his SHO or registrar Statistical comparisons were made using the χ test

RESULTS

Data from the surgical trial is shown in *Table 1* Ninety-nine patients were entered 51 were allocated to wear high compression stockings and 48 low compression The two groups were comparable for age sex surgical procedure and number of avulsions.

A large number of patients in high compression stockings found the stockings uncomfortable The incidence of local thrombophlebitis in the two groups was almost identical

Table 2 shows the data from the compression sclerotherapy trial Fewer patients (62) were recruited but the group was again comparable for age sex and number of injections A similar number from each group removed their compression during the six weeks of treatment A stocking alone slipped down more frequently than a bandage and a stocking but was more comfortable Results were assessed as good if all the veins were obliterated and fair if some residual veins persisted but the leg was generally improved No patient had a poor result without improvement This probably reflects the benefit of compression alone As continuous compression is considered important after sclerotherapy the results were compared in those who had removed their compression (n = 18) with those who had followed the in

Table 1 Results of high versus low compression stockings in post surgery patients

	High Compression	Low Compression
Number	51	48
Sex	21 F 30 M	21 F 27 M
Age	(range 23–74 years)	(range 21–74 years)
Operation		
1 SF ligation and avulsions	32	37
2 SP ligation and avulsions	5	4
3 Avulsions alone	12	7
Number of avulsions	Mean 6 6 (range 2–20)	Mean 7 8 (range 2–21)
Results at six weeks		
Discomfort	18 (35 3%)	14 (29 2%)
Thrombophlebitis	5 (9 8%)	5 (10 4%)
Cost of stocking 1987	£8 20	£4 40

SF = saphenofemoral SP = saphanopopliteal

Table 2 Results of stockings versus bandages and stockings in compression sclerotherapy patients

	Stocking alone	Bandage and stocking
Number	31	31
Sex	21 F 10 M	24 F 7 M
Age	Mean 39 3 years (range 24–67 years)	Mean 39 7 years (range 17–71 years)
Number of injections	Mean 3 2 (range 1–6)	Mean 3 6 (range 1–6)
Result at six weeks		
Discomfort	8 (25 8%)	12 (38 7%)
Slipped down	13 (41 9%)	10 (32 2%)
Thrombophlebitis	9 (20 0%)	13 (41 9%)
1 Good	24 (77 4%)	21 (67 8%)
2 Fair	7 (22 6%)	9 (32 2%)
Cost 1987	£8 20	£10 30

Table 3 Effect of removing compression in sclerotherapy patients

	Thrombophlebitis	Good results
Compression removed $n=18$	6 (33 3%)	11 (61 1%)
Compression maintained $n=44$	15 (34 1%)	33 (75 0%)

structions and had not ($n=44$) (*Table 3*). The incidence of thrombophlebitis in these two groups was the same but there were more good results in the group which had uninterrupted compression.

The differences in these results do not reach statistical significance. To show a significant difference at the 10% level would require at least 250 patients in each group which would be difficult to achieve in a reasonable timescale. The results however do support the hypotheses that after surgery a low compression stocking is preferable to a high compression stocking, and after sclerotherapy a stocking alone is preferable to a stocking and bandage combined.

DISCUSSION

There can be little doubt that some form of compression is required after treatment of varicose veins both by surgery and sclerotherapy but there is little consensus of opinion as to the pressure required or for how long. Different authors have recommended support after surgery for periods ranging from five days to five weeks[2,7,8] to control discomfort thrombophlebitis bruising and ankle swelling. Our choice of six weeks was somewhat arbitrary and based on previous practice. It is possible that a shorter period of two to three weeks may be adequate. Perhaps the duration of compression should depend on the individual and patients then allowed to discard their stockings when they

feel they no longer need them. Our results indicate that after surgery low compression stockings are more comfortable than high compression stockings and equally effective on controlling thrombophlebitis. Bruising and ankle oedema were not a problem in these patients after surgery. We did not attempt to assess the results of surgery at the six week review as this was too early to do so and probably dependent on the skill of the surgeon in avulsing all the varices rather than the compression used.

After sclerotherapy Fegan[3] recommended six weeks compression with a bandage and stocking but gave no guidelines as to the pressures required. Fentam *et al*[4] investigated the pressures required to occlude a superficial vein model and the pressures achieved by bandaging. They concluded that pressures of 30–50mmHg were needed and could be achieved by bandages and a pad. There was however considerable variation in the pressure achieved by different surgeons. Kay *et al*[5] showed that pressures beneath bandages fall to zero after six to eight hours, suggesting that bandaging alone is inadequate to maintain compression.

With regard to the duration of compression it has been suggested that using bandages for as little as three days may be adequate.[6] Reddy *et al*[10] conducted a trial to compare periods of one, three and six weeks bandaging concluding the three weeks produced optimal results. These different results can probably be explained by differences in bandaging technique between individual surgeons. Gradnated compression stockings are designed to produce reproducible and maintained pressures. Scurr *et al*[11] have shown that stockings alone produced better results than bandaging alone after sclerotherapy.

The results of this trial have demonstrated that bandages are not required after sclerotherapy if a high compression stocking is used. The optimum period of compression has not been determined.

Present practice in this unit, therefore, is to apply a low compression stocking after varicose vein surgery and a high compression stocking alone after sclerotherapy. Good results have been produced with minimal cost.

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Changes in the Incidence of Medical Conditions at the Commando Training Centre, Royal Marines

D I Riddell

Introduction

THE Commando Training Centre Royal Marines (CTCRM) is unique in that it trains a wide variety of men for a multitude of different tasks. These courses include the basic training of Royal Marines and their officers, the training of non-commissioned officers and also specialists such as platoon weapon instructors, drill leaders, physical training instructors, signallers and clerks to name but a few. There can be 30–40 separate courses running concurrently. Not surprisingly, the more physical courses tend to cause proportionally more problems for the medical staff of the Centre.

Between 1981 and 1985 two major changes occured at CTCRM. The first followed the paper published on a large outbreak of Streptococcal pyoderma in CTCRM. Preventative measures using iodine were instituted. The second, following the Falklands War, was the introduction of a new boot.

It is the intention of this paper to examine the consequences of these changes.

METHODS

The Sickbay maintains a daily sick book in which diagnoses are recorded. These were extracted. The population at risk was established for the two years 1981 and 1985 by contacting the relevant Service sources.

It was therefore possible to calculate the average number of attendances with a particular condition per month per thousand of population at risk. This population includes both trainers and students.

RESULTS

There were a total of 10 468 recorded attendances in 1981 and 8 172 in 1985. The average daily population in 1981 was 1632 and in 1985 it was 1534. The average monthly attendance rate was 623.1 in 1981 and 535 in 1985, a highly significant fall (chi square, $(\chi)=160$, degrees of freedom = 1, $P<0.001$). In *Table 1* the categories of attendance are shown.

Injuries. Table 2 shows that there has been no change in injury rates ($\chi^2=3.6$, $P>0.05$). In the major injury categories (back, upper body and lower limb) those that cause most losses there has been no overall change in incidence.

Table 3 examines lower limb injuries (LLI) in more detail. Of note are reductions in foot, ankle and knee problems. There have been increases in achilles tendonitis, shin pain and blisters.

Infections. Table 4 shows that respiratory tract infections the commonest infection at CTCRM are similar for both years. There is an apparent reduction in gastrointestinal infections.

There has been a drop of almost two thirds in the occurrence of skin sepsis which is highly significant ($\chi^2=36.1$, $P<0.001$).

DISCUSSION

At all stages of their careers Royal Marines are training for war. This is very arduous and therefore overuse injuries are common as evi

Surgeon Commander Riddell was previously Principal Medical Officer at CTCRM. He has now retired from the Royal Navy.

Table 1 18 640 attendances at CTCRM sickbay with various medical problems expressed as attendances per month per 1000 at risk

	1981	1985	χ^2	P
Injury	344 4	335 1	3 6	>0 05
Infection	197 6	134 2	203	<0 001
Other	81 1	65 5		
Total	623 1	534 8	160	<0 001

Table 2 11 047 attendances with injuries at CTCRM sickbay shown as attendances per month per 1000 at risk

	1981	1985	χ^2	P
Back	16 1	16 6	0 17	>0 5
Upper body	35 0	35 4	1 85	>0 05
Lower limb	256 2	256 5	0 32	>0 5
Other	37 1	26 6		
Total	344 4	335 1	3 6	>0 05

Table 3 6 329 attendances at CTCRM sickbay with LLI shown as attendances per month per 1000 at risk

	1981	1985	χ^2	P
Foot	37 7	30 6	12 8	<0 001
Ankle	42 9	36 5	8 9	<0 01
Achilles tendonitis	9 8	14 2	19 3	<0 001
Shin	14 1	20 3	19 3	<0 001
Knee	68 4	48 2	59	<0 001
Blisters	29 9	50 9	167	<0 001
Other	53 4	45 8		
Total	256 2	256 5	0 32	>0 5

Table 4 5 424 attendances at the CTCRM sickbay with infections shown as attendances per month per 1000 at risk

	1981	1985	χ^2	P
Skin sepsis	68 2	23 1	363	<0 001
Respiratory	75 5	71 3	2 3	>0 01
Gut	39 4	31 2	19 4	<0 01
Other	14 5	8 6		
Total	197 6	134 2	203	<0 001

denced by attendance rates of 623 (1981) and 535 (1983) per month per 1000 population at risk Physical standards were pretty well unchanged darmg these two one year periods This is reflected well by the similarity in the mata categories of injury (back, upper body and LLI)

Footwear

In 1981 the directly moulded sole boot was used for training This was an ankle boot wora with pulices and weighing 3¾ pounds. In February 1984 the Royal Marines high combat boot was introducted and this was worn by most trainers and students by the start of 1985 This was a high boot and weighed 4¼ pounds

The American army looked at hot weather boots aad black leather boots in 1983[2] bat in spite of a 97 page report were unable to differentiate betweea the boots in terms of injury There were however only 142 sickbay atteadances by the 2074 partieipants The anthors were struck by the fact that the better impact and energy absorption characteristics of the black leather boot had not shown any improvement by reducing LLI

This study would support the finding that LLI rates are unchanged by different boots and the anthor proposes that LLI are caused by the type and durmion of trainiag rather than the foot wear The boot though probably dictates the location of the injury

This would be supported by the reduction of ankle problems, most of which are lateral ligament strains The high boot supports the ankle joint In supporting the joiat it also restricts flexion when rnaning thereby reducing bending of the knee Less stress through the bent knee will lend to fewer cases of anterior knee para which these findings support The stress must move elsewhere aad this paper would suggest that it is the tibia that takes the strain as evideaced by the increase in shin pain In a separate paper it will be shown that the number of tibial stress fractares has increased with the aew boat.

The increase in blister uambers is due to the early breakdowa of nearly one third of the boots that were issued and it is far this reasou that the high combat boot has been abaudoued On purely medical groands the high boot must be the preferable optiou as any measure that appears to reduce auterior knee pain by almost a third must win approval Knee pain is still the largest medical cause of lass of trained ranks aad trainees

Skin Sepsis

As was meatioued in the introduction to this paper Cruickshank *et al*[1] carried out a major investigatiou into a large outbreak of Streptococcal pyoderma in CTCRM in 1979/80 They made varions recommendations, which are fully described in their work to reduce the incidence of this disease By December 1980 they felt the outbreak was reasonably well controlled although there were still one or two new cases each day Certainly there were 68 attendaaces per thoasand at risk per month in 1981 when coatrol measures were becoming accepted as aeeessary and this had fallen to 23 by 1985 due oae must assume to the coatraaation of these coatrol measures Although this is a great improvement it is still a high level of poteatially preveatable infection It would be a mistake to discontinue the control levels particularly in view of the 30% mortality recently reported to be assotiated with Group A Streptococcal soft tissue iafection [3]

CONCLUSIONS

Any item of equipment that appears to reduce knee pain in Royal Marines must be welcomed eathusiastically by the military medical profession as this is a complaint which we are powerless to influence It is also the major medical cause of loss of both recruits and trained men If the price to be paid is an increase in shin para and tibial stress fractures it would seem aa acceptable oae as it is often possible to treat these problems Unfortunately the Royal Marines High Combat Baot has been discontinued due to its poor manufactare but a high boot is still issued

The reduction in skin sepsis shows that medical intervention can help in solving problems produced by the ardaous training programmes to which we expose our men

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Abstracts—Papers by Royal Naval Medical Officers

Walker AJ, Plant GRT Rees M New hope for claudicants. *Practitioner* 8 April 1990 234 328

Intra arterial thrombolytic therapy for the treatment of previously operable ischaemia is discussed with regard to two case reports

Walker AJ Taylor EW Lindsey G Dewar EP and the West of Scotland Surgical Infection Study Group A multicentre study to compare piperacillin with the combination of netilmicin and metronidazole for prophylaxis in elective colorectal surgery undertaken in district general hospitals *J Hosp Infect* 1988 11 340–348

We have conducted a multicentre randomized study to compare piperacillin with the combination of netilmicin and metronidazole in patients undergoing elective colorectal surgery There was no significant difference in the incidence of operation related infection chest or urinary tract infection Major life-threatening sepsis occurred in 6% and the overall incidence of operation related infection was 24% Organisms which normally inhabit the bowel lumen were cultured from most of the postoperative infections however Staphylococcus aureus was isolated as a causative organism in nine patients in the piperacillin group compared with none in the netilmicin and metronidazole group We are concerned at the high incidence of infection in both groups and we believe that other factors in addition to prophylactic antibiotics need to be evaluated if the incidence of infection is to be reduced further

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Book Reviews

Periodontology and Periodontics: Modern theory and practice Sigurd P Ramfjord and Major M Ash Pp 370 Ishiyaku EuroAmerica (USA) June 1989 Distributed by Gazelle Book Services (Lancaster) £46 50

This book was written by the well known team from the University of Michigan Professors Ramfjord and Ash as a reference work for students dental hygienists and practising dentists It is a well laid out structured and comprehensive review of the discipline It is mainly a text for clinical practice scientific detail has been kept to a minimum but is sufficient for the required background At the end of each chapter is a long list of references

There has been over the years the East and West of the Atlantic views and practices associated with periodontology and periodontics It is pleasing to see that many of the references originate in Europe as well as in the United States, hopefully providing a balanced view of the subject. The layout of the book consists of early chapters highlighting the background scientific basis to periodontology followed by a large section on the clinical applications and techniques The first few chapters are devoted to the anatomical and histological features of the periodontium both hard and soft tissues There follows a chapter dealing with the classification epidemiology and natural history of periodontal diseases The classification of periodontal disease is kept to a relatively straightforward list The burst theory of periodontal disease is very briefly referred to and then dismissed The pathogenesis and histopathology of periodontal disease is discussed in relation to the tried and tested dog and to the human model

The immune response and its relationship to periodontal destruction is referred to at several points throughout the text and in particular in the chapters dealing with the aetiology of periodontal diseases. AIDS virus associated periodontitis is briefly mentioned

The remainder of the text deals with the clinical practice of periodontics from examination and diagnosis through initial therapy stages to mucogingival surgery All stages are well illustrated and techniques are fully explained

There is a small reference to the principles of guided tissue regeneration using a membrane millipore or Goretex but no details are included for this technique because it is claimed that all the goals for regeneration of the supporting structures have yet to be ultimately satisfied by minimal clinical procedures" Tried and trusted methods are therefore the order of the day

The relationship of periodontics to other disciplines, in particular restorative aspects is covered in one chapter

Apart from a few interesting spelling errors ("use of silver point in dentistry (page 131)) this book is well presented and structured and is ideal for students dental hygienists and general practitioners in particular those preparing for the Diploma of Membership in General Dental Surgery of the Royal Colleges

RMS

Diving Medicine 2nd edition Alfred A Bove MD Jefferson C Davis MD Pp333 W B Saunders 1990 £35 95

The first edition of *Diving Medicine* edited by Dr Richard Strauss, was published in 1976 This edition has been extensively revised to provide an overview of "the clinical practice of diving medicine The editors should be commended for recruiting a group of true world authorities to prepare the various chapters The book is organised logically into two sections an overview of diving physiology followed by a comprehensive review of clinical diving medicine The first section includes chapters on the physics physiology and equipment used in diving. Most of the chapters present easily understood reviews of the subjects However a few chapters such as chapter 4 Mechanisms and risks of decompression have attempted to be encyclopedic but brief with the result that sections are difficult to follow even for the well informed. The second section provides specific guidance by organ system on fitness to dive along with a brief treatment overview which should be helpful for any physician involved in the clinical care of divers Additionally there is an excellent review of the potential medical problems which occur at different stages of a dive including their presentation and differential diagnoses

With any anthology extensive editing is required to create a cohesive volume Sport diving medicine is one of the most empirical and controversial of medical subspecialties this is particularly demand

ing challenging preparing a book such as *Diving Medicine* It is unfortunate that some of the editors died during its preparation and consequently it is not surprising that much of the antinomy relates largely to the way in which the text was edited Chapters frequently contain similar or repetitive information Some of the repetitive material presents divergent views which may serve to confuse and frustrate readers not familiar with the controversies It would have been helpful if the editors had highlighted these and offered an impartial review of the debate In addition a few of the chapters such as Chapter 17 Aseptic Necrosis of the Bone have not been revised sufficiently and therefore appear to be somewhat dated

As an overview of the clinical practice of diving medicine this text can be recommended *Diving Medicine* is particularly strong with regards to the presentation of the problems that may arise in association with diving, the pathophysiology of these conditions, and the general evaluation of divers In conclusion the positive features of the book significantly outweigh its shortcomings and it should provide useful reference for those with a particular interest in diving medicine

DJS

Directions in Nursing Research Eds Jennifer Wilson Barnett and Sarah Robinson Pp 302 Senten Press (Harrow on the Hill) November 1989 Distributed by Gazelle Book Services (Lancaster) £17 50

This book is a composite of the nursing research undertaken at King's College London University since 1987 The research has focused on four main areas of concern monitoring and improving the delivery of care exploring the views and experiences of patients and their relatives evaluating and developing the educational preparation available to basic and post basic levels and investigating reasons for retention in and loss from the profession through long term follow up studies of the patterns of staff

Following an introductory chapter by the editors which discusses the development of research within nursing and particularly within King's College there are 28 research reports. The aim has been to produce a collection of studies that will be of interest to nurses, midwives and health visitors who work in practice In education and in management This is certainly the case as the selection of research topics comes from all aspects of the nursing profession and are pertinent to many Although the text is essentially for the nursing profession there are several reports which should be of great interest to doctors and others working in the care sector for example Communication and Health Education Patients Perception of Acute Pain and Recovery from Surgery

The style of presentation and the clarity of the information assists with the reading of the reports The variety of methodologies demonstrated is a useful guideline for those considering undertaking research and the findings are a baseline for implementing change

This paperback is an excellent reference book which should be readily available

HRMS

The Maltese Penguin Frank Cockett Pp 128 London Smith-Gordon and Co Ltd June 1990 £10 00

Penguins was the collective description applied by RAF Aircrew to the ground support officers during the early days of the Second World War Frank Cockett a medical officer with surgical aspirations, was numbered amongst the penguins that supported the flyers who defended the Maltese Islands during the final convulsions of the aerial bombardment by the Axis powers He then saw a role reversal as the squadrons based in Malta and Gozo took up the offensive in support of the landings of the allies in Sicily

In his published his recollections of these events a very personal view that will invoke memories in survivors of those days half a century away and also in the many Servicemen and their families whose duties took them to these tranquil islands post war

It is particularly relevant that this collection of essays should be reviewed in the Journal of the Senior Service as much of Flight Lieutenant Cockett's time was spent in company with the Albacore Squadrons of the Fleet Air Arm based at RAF Hal Far a group of aviators who have not featured with any prominence in earlier official histories or memoirs This individual episodes are quite short and each is complete in itself an ideal format for opportunistic reading This story is told in the first person and in the present tense in straightforward narrative style that inflates the author's eye for detail that served him well during the conflict and subsequently as a Consultant Surgeon The essays are complemented by three appendices which provide supportive communications from other sources which in part relate to the Fleet Air Arm Gozo and also a cartoonette of a singular character who epitomised the exhilaration and frustration of the RAF in war

Mr Cockett achieved his aspirations and became a Consultant Surgeon at St Thomas's Hospital London where he had a special interest in vascular surgery His reputation as a surgeon is now rivalled by his excellence as a story teller he has produced a very readable book in which recollections have the stamp of authenticity

Queen Alexandra's Royal Naval Nursing Service

Kathleen Harland MA

This book was commissioned to be written by Kathleen Harland for the QARNNS Centenary celebrations in 1984. The high cost of publishing and corresponding lack of funds put the project into abeyance until it was brought to the attention of the Editorial Committee of the Journal of the Royal Naval Medical Service. Only through the financial backing of the JRNMS, who have acted as publishers, has it been possible to print the book.

Mrs Harland has written a comprehensive account of the History of QARNNS from their inception in 1884 up until 1988. It is a book which combines history, general interest and some anecdotes in an easy to read style. She relates the initial antipathy to females being attached to the Royal Navy, the conditions under which some QARNNS Officers served in WW2 and describes the trials of service during the Korean War and latterly the effect of the Falklands War. The book will be of interest to historians in particular the comprehensive tables at the back of the book which cover a diversity of subjects including Honours and Awards and Establishments where QARNNS Officers have served. A wide selection of photographs provide contrast and further interest for those people who may prefer just to browse through the pages.

The book costs £8.50 which includes postage. For those who can collect direct from the Office of Surgeon Commodore (NMT) the cost will be £7.50. To order a copy of the book you are requested to complete the form below and send to: ISTC Office of Surgeon Commodore (NMT) Monckton House, Institute of Naval Medicine, Alverstoke, Gosport, Hants PO12 2DL.

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LETTERS TO THE EDITOR

Dear Sir

A Narcoleptic in the Navy

The Narcolepsy Association likes its members to make this condition as widely known as possible I therefore append the following in the hope that it might help some member of the Service unfortunate enough to suffer from the condition

While I was in the secondary modern school aged about 17 I started falling asleep in class and started going to bed early in the evenings

At the age of 15 I signed on in the Royal Navy and found myself in training at HMS *St Vincent* joining on 9 March 1948 First I was in Dunean 123 class but after a spell of three weeks in Hestar with an ear infection I was put back to Blake 124

My worst memories of that period were in seaman ship and gunnery classes I was often found standing in class with a 4 projectile on my shoulder and after a while the instructors would make me stand up as soon as they came into the classroom I was made to stand through many lessons from beginning to end to prevent me from falling asleep

After training on HMS *Ulster* at Rosyth I was drafted to HMS *Crossbow* in the Home Fleet I remember my first half hour on bridge lookout during the first watch I was on the starboard lookout position and the QOW a commissioned hostilities gunner woke me up four times

On promotion to ordinary seaman I went to Chatham gunnery school and again dreaded each day watching those dreary instructional films that they now use clips from in modern day instructional technique films to show how a film should not be made Then there were the exams of dictated notes mine always had strange gaps in them and in some places letters just trailed off into a squiggly line where I nodded off while writing

I qualified as an RC3 and eventually arrived on HMS *Cossack* in the Far East At a time when we were in two watches (four hours on four hours off) in the T5 during the Korean patrols I got two days sixteens for being adrift from a piping party to receive the returning ship's captain while I was four off I was of course asleep After several warnings for sleeping in front of the radar I was moved to the upper deck where I was given an action station as hoist crew

Back at *Pembroke* I managed to go undetected when I fell asleep during my two hour stints as dormitory patrol on several occasions I [illegible] how I felt when, as a member of the duty watch I had them time to time to witness the reading of a warrant for someone who was going to the cells for being found asleep on watch

I had not been on my last ship the cruiser *Superb* very long before I was in trouble I was damage control party and had a nice little cabinette in the forward DC sick station Having got my head down after dinner one day I was woken by the door rattling. I could hear the Jimmy and the DC officer talking By this time both watches had turned to for the afternoon I thought that if I kept quiet they would go away Unfortunately I didn't realise that the key which I had left in the lock poked out of the other side I heard someone say there must be someone in there as the key is in the lock, so I rather sheepishly opened the door and made some excuse

Luckily I got away with a warning.

In November 1956 I was discharged below Naval physical standard due to an ear problem

After leaving the Service my condition got worse I used to fall asleep while working up ladders walking along and on occasion while driving a lorry. I then began to experience other conditions associated with narcolepsy one being cataplexy a condition where one collapses from between a few seconds to several minutes at a time

Looking back I realise how fortunate I was in only getting defaulters once I guess I could have been court martialled for falling asleep on duty in a war zone

After many visits to GPs I was at last diagnosed as narcoleptic and began to receive treatment in 1987 I am currently employed at a Merchant Navy College as Chief Firefighting Instructor and Safety Officer It is very difficult trying to stay awake and concentrate when involved in paper work on one's off days It can also be extremely embarrassing when I nod off while lecturing to a class I have now applied for medical severance because of my condition which has been aggravated by a pulmonary embolism caused by a road accident last July

Narcolepsy is a serious lifelong, potential disabling disorder estimated to afflict more than one in every 1000 persons and most narcoleptics are undiagnosed It can strike anyone at any age though symptoms are

usually first noticed during the early teens There is no known cure and no completely adequate treatment is available

Very often the first symptom noted is excessive daily sleepiness (EDS) It is sometimes expressed as sleepiness, tiredness, lack of energy sleep attacks or irresistible sleepiness Although this pathological sleepiness is present every day the intensity varies throughout each day and the afflicted may only be troubled by or even aware of the more severe of the daily episodes EDS becomes most obvious when as is often the case the sufferer becomes drowsy or falls asleep at inappropriate times e g in the middle of a conversation while sitting in class or eating a meal

I remain Sir yours sincerely

P Relf

Su

Resuscitation Box—What do I put in my M88?

During a recent Amphibious Surgical Support Team exercise there was an opportunity to take portable resuscitation equipment which a ship borne Medical Officer might reasonably carry to the scene of an incident to treat one to two major emergencies or up to five minor/emergency patients Since the M88 (Medical Officers Case) is supplied empty the following is offered as a suggestion for content A current cost estimate is provided for those who might consider carry similar equipment in the boot of their car

Airway

Laryngoscope batteries ×2 spare bulb
Endotracheal tubes sizes 4 5 6 8
Nasopharyngeal airways, sizes 3 5 7
Guedal airways sizes 2 3 4
Magills forceps
Catheter mounts for ETT
Gum elastic ETT introducer
KY jelly
Small (10cm × 10cm) swabs ×20
Pasvers right angled torch
Hand/foot powered suction unit (capable of generating 50 kilopascals negative pressure)

Breathing

Stethoscope
4 litre O_2 cylinder with face mask and tubing
Argyle chest drains ×2
Heimlich valves ×2
Portex Mini Trach kit

Bleeding/injury

Scalpel disposable ×3
Haemostatic clamps ×2
Hand held 2/0 blank silk sutures ×2
Scissors, dressing with plastic handle
Triangular bandages ×4
Field dressings large ×4
small ×4
Soft cervical collar
Inflatable jet splint arm size ×1
leg size ×1
Aneroid sphygmomanometer

Intravenous fluids

Hartmanns, 100ml ×3
Haemaccel 500ml ×2
I/V giving sets ×2
I/V cannulae sizes 14 16 18 gauge
Internal jugular cannula, size 16 gauge
Mediswabs ×6
Urinary catheter 14 French gauge with bag, ×2

Resuscitation drugs

Normal saline 100ml bottle ×1
Adrenaline 1mg/ml ×5 ampoules (amps)
Calcium chloride 10mg/ml 2 × 10ml amps
Atropine 0 6mg/ml ×5 amps
Methyl prednisolone 1g plus a diluent ×4
Cardiac lignocaine 100mg plus 1g pack ×1
8 4% sodium bicarbonate 2 × 50ml vials
Glucose 50mg/ml 50ml bottle ×1
Frusemide 20mg/ml 5 × 2ml amps
Ventolin injection 500g 4 × 1ml amps
Verapamil 5mg/2ml 2 × 2ml amps
Chlorphenaramine 10mg/ml 2 × 1ml amps
Hydrocortisone 100mg/2ml 3 × 2ml amps
Syringes 10ml 5ml 2ml 1ml ×5 each
Hypodermic needles
Aponle file

Antibiotics

Cefuroxime 750mg ×10 vials
Metronidazole 500mg/100ml ×5 bags

Analgesia/sedation/anaesthetics

Diclofenac 50mg tablets ×100
Morphine sulphate 10mg/ml 10 × 1ml amps
Metoclopramide 10mg/ml 10 × 1ml amps
Midazolam 10mg/2ml ×5 amps
Ketamine 100mg/ml 2 × 10ml vials
Prilocaine 0 5% 20 multidose vials ×5
Naloxone 0 4mg/ml 2 amps

This equipment may be carried as follows

1 O_2 cylinder tubing self inflating bag, mask and tubes foot operated pump and jet splints in orange polypropylene valise (AMPU)
2 Other drugs and equipment in M88

The project outlay cost (1990) for this equipment is £1000 with a £100 annual refurbishment cost

C T Braithwaite
Surgeon Lieutenant Commander RN
DPMO HMS Invincible
A K Howell
POMA(O)
HMS Invincible

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Merrill SB Janplan Anaesthetic Unit Sept 1981

Sir

The management of heat illness

Simon Travis and I have made use of your letters page (74 203 and 75 124) to discuss heat illness following his original article[1] I feel this is an important subject especially after recent events widely reported by the media

I carried out a pilot study on 16 patients with exertional heat illness and report the results in the table Three different treatment regimes were used

1 Intravenous infusion

2 Intravenous infusion fan and cooling in a tepid bath

3 Fan and cooling in a tepid bath

I gave two litres of normal saline to 15 minutes and temperatures were recorded rectally using a Grants thermistor thermometer There was no significant difference between rectal temperatures after 15 minutes ($P>0.5$) or fall in temperature over the 15 minute period ($P>0.1$) for those given intravenous fluids. Those not given intravenous fluids had higher rectal temperatures after 15 minutes ($P<0.001$) and a smaller drop in temperature ($P<0.001$) and for this reason I discontinued that treatment after only four patients The small fall in temperature is probably mainly due to the fact they have missed exercising

Travis quotes Wyndham *et al*[2] to support the use of evaporation by tepid sponging and wind to reduce body temperature The subjects employed can not be compared with true exertional heat illness cases They were exercised in heat until no longer able or their temperature reached 104°F (40 C)—none were reported to have peripheral vasodown Wyndham then extrapolated his findings to 106 F (41 C) and calculated that it would take 45 minutes to lower the rectal temperature to 101°F (38 3°C) Personally I can see no point in evaporative cooling when infusion of fluids reduces core temperatures to similar levels in one third the time

Table 1 Temperature falls after different treatments for heat illness

Group	1	2	3
Treatment	IVI	IVI/Evap	Evap
Number	5	6	4
Temp before treatment	40 2	40 0	40 2
SD	0 62	0 58	0 63
Temp after 15 minutes	37 9	38 0	39 4
SD	0 78	0 41	0 66
Fall in temperature	2 3	2 0	0 9
SD	0 21	0 24	0 09

Finally in this country the definitions heat stroke and heat exhaustion are unknown and should be abandoned The diagnosis of heat illness is made on the history of exercise and the finding of a raised rectal temperature. The decision to rehydrate orally or intravenously is made on the patients clinical condition If there is doubt the intravenous route should be used

Yours truly

D I Riddell MBE MD

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1 Travis SPL. Management of heat stroke. *J Roy Nav Med Serv* 1988 74 39–43

2 Wyndham CH Stryden NB Cuoke HM *et al* Methods of cooling subjects with hyperpyrexia *J Appl Physiol* 1959 14 771–776

J roy nav med Serv 1990 76 118–122

OBITUARIES

Sir Paul Mallinson FRCP FRCPsych, Emeritus Civil Consultant in Psychiatry to the Royal Navy died 18 March 1989 in his eighty-sixth year



Surgeon Captain J. L[illegible]

Paul was born in 1903 and educated at Westminster where he remembered the fagging system with Kim Philby as a small boy with an overlarge gown tinkling in the dust across the School Quad. By different channels of circumstance Kim and Paul's subtle and patient skills at unearthing quirks of personality might have saved the country much agony.

Paul received his medical education through Christchurch at Oxford and then at St Thomas's before qualifying in 1935. He gained the MRCP in 1938 and was awarded prizes in psychological medicine and a Rockefeller fellowship. On 23 January 1940 within months of the outbreak [illegible] the RNVR as a Temporary Surgeon [illegible] promoted to Acting Surgeon [illegible] a day later. He was appointed to HMS [illegible] twice at the RN Auxiliary [illegible] Barrow Gurney near Bristol with a team [illegible] like he were all later to become distinguished in the discipline. They dealt with problems of warfare mental stress in service men variously diagnosed and labelled as Shell Shock Disorders Action of the Heart or Post Traumatic Stress Syndrome depending on the era of the fashion of hammering old entities.

On 15 November 1943 he was transferred to HMS *Pembroke* for the Naval Hospital at Chatham and left the Service for civilian life on 19 January 1946. He succeeded his father as the third holder of the baronetcy (Mallinson of Walthamstow) on 31 March 1944. At St George's he was joined by Dr Curran who had also been part of the Naval team at Barrow Gurney and they built up a happy unit of some renown. Five registrars from this grouping became Professors of Psychiatry at other places in the years unfolded. The Atkinson Morley Hospital and 15 Knightsbridge provided the group with their inpatient and outpatient departments and Paul's Rover cautiously bore the registration AMH 15 thus loyally supporting both establishments.

Paul became Civilian Adviser to the Medical Director General of the Navy when such posts were created in all the specialties in the early 60s. He was as supportive and encouraging to the Naval trainees in psychiatry as he continued to be to those at St George's. His chunky quiet style and manner wholehearted backed some of us when troublesome senior patients or their families added the threat of

Monnithatten will fix you to the Admiralty demands.

He entertained all Naval psychiatrists and their wives to dinner at Wansash Yacht Club in the later 1960s and in the 1970s host as his club the Atheneum for the Anglo-American Triservice Psychiatrists dinner when it was the Royal Navy's turn to host the occasion.

Paul married Ella Guy in 1940 and they had one son and two daughters one of whom became a doctor. The marriage was dissolved in 1968. He married secondly Dr Margaret Cooper Bowden and she accompanied him at several Naval Psychiatric

sonal sensations Margaret cared lovingly for him in his later years of prolonged ill health

As with his civilian interests, one could always turn to him for help and advice within or outside a naval context and his interest and support were always there. Kindness, gentleness, common sense and great generosity marked him out above all others. Vale.

Surgeon Captain Peter Septimus Fuller Royal Navy died in hospital on 15 December 1989 at the age of 75.

Surgeon Captain John Ross writes

Peter Fuller graduated at University College and the Westminster Hospital, joining the Royal Navy early in 1939.

At the outbreak of war he was appointed to HMS *Waverly*, a paddle steamer converted for minesweeping duties. Involved in the Dunkirk evacuation and carrying 600 injured troops, she was sunk with many losses of life. Peter was then transferred to HMS *Veteran*, which he left six weeks before she, too, was sunk. There followed appointments to *Excellent* and *Sakar* in the USA on the Naval Staff. A final move to HMS *Cleopatra* completed his wartime service.

A first post war posting was to Ceylon where his arrival coincided with an outbreak of smallpox among the local population and of poliomyelitis among the forces and their dependants. Later was largely responsible for containing the situation. He was to return to Ceylon as Naval Medical Officer of Health in 1951 before being appointed Staff Medical Officer, Scotland in 1954.

1955 saw a move to RNH Plymouth as Command Naval Medical Officer of Health, an appointment which included responsibility for the running of the laboratory. Within a short period he had succeeded in having pathology recognised as a specialty within the Service and became the first naval medical officer to be elected a Member of the Royal College of Pathologists. Pathology was to remain his main field of interest until his early retirement in 1969 to join the Metropolitan Water Board.

On the reorganisation of the water industry and the formation of the Water Authorities in 1974 Peter became Medical Adviser to Thames Water until his retirement to Golant to pursue his hobbies of gardening and sailing.

Those who had the good fortune to serve with Peter knew him as someone of honesty and integrity with a wonderfully dry sense of humour.

Away whom he married in 1940 and their daughter Sarah survive him.

Surgeon Captain Eric Arthur Penn DSC Royal Navy died 24 November 1989 at the age of 75. He was born at West Ham on 20 October 1913, spending his boyhood at Westcliff-on-Sea where he attended Southend High School for Boys. He loved the sea from an early age but poor eyesight precluded a conventional Naval career. He decided upon medicine, qualified in 1939 and entering for Short Service on the outbreak of war. His first posting was to Atlantic duties. During the Dunkirk evacuation he spent seven days on end treating wounded troops on ships shuttling across the Channel. He was awarded the DSC in 1941 following the sinking of the gunboat HMS *Ladybird* in Tobruk harbour where he discembarked 14 wounded under fire and was later in a ship that was torpedoed en route to India, completing the greater part of his journey on a raft. While it was undergoing a refit Eric served in a military hospital in India, a period he remembered with the greatest pleasure. He transferred to the Permanent List in December 1943 and served again in the Mediterranean, being on Malta at one stage. Prior to D-Day he was attached to Canadian Forces. His final wartime posting was to Murmansk where he also served as Kings Harbourmaster. He was promoted Surgeon Lieutenant Commander in June 1945. After the war Eric Penn returned to his specialisation (radiology) but decided quickly that he preferred being at sea serving at various periods on *Illustrious* (1952–1954) when he was promoted Surgeon Commander on *Gambia* (1959–1960) as Flotilla Medical Officer to Flag Officer Flotillas Home Fleet and on *Victorious* (1960–1962). He was posted at various times to Forton Down to Simonstown (1956–1958) as Fleet Medical Officer on the staff of C-in-C South America and South Africa Station to HMS *Mercury* (1962–1964) and as FMO Royal Marines Eastney (1964–1966) being promoted Surgeon Captain in 1965. His final appointment was to HMS *Pembroke* as Staff Medical Officer to Flag Officer Medway from whence he retired in 1970.

After a round the world holiday Eric took up a second career with MOD (Navy) in 1971 as a Final Examining Medical Officer retiring again in 1982.

He was a keen small boat sailor and retained a strong interest in all aspects of maritime life. He also derived much pleasure from bird watching and was a supporter of the Royal Society for the Protection of Birds.

Surgeon Captain B Hampton writes

Together with Surgeon Lieutenant T & W Hampton I served a full commission on HMS *Victorious* in 1960–61 under Eric Penn as PMO. His distinguished war service had rendered him totally unflappable and with an unequalled insight and knowledge of the ways of sailors, Naval Officers and junior doctors. He personally undertook all these difficult and tiresome pseudo medical tasks at the medical/executive interface that are a daily occurrence in a large operational ship. He gave all his large medical department total support, never interfered and allowed us just sufficient rope to gain experience without hanging ourselves.

He spent hours walking round the ship and ashore and he lived so that he could talk to everyone. His knowledge of his patients and the nature of their work was exceptional.

Front [illegible] intemperaments at this time I have [illegible] of my good fortune to have served with [illegible] wise sensible and kindly person

Surgeon Captain James Simpson Ritchie OBE MFCM DLO Royal Navy died 20 February 1990 at the age of 67. He joined the Royal Navy as a Surgeon Lieutenant following his qualification at Aberdeen in 1945 and transferred to the Permanent List in January 1947. He was promoted to Surgeon Lieutenant Commander in November 1953 and to Surgeon Commander in June 1959. He had a varied career serving in ships ranging from a landing ship (tanks) to an aircraft carrier and as ENT surgeon at Plymouth and Chatham. He proved himself in most able administrator as SMO(Admin) at Plymouth and Gibraltar and as SMO Cdo Forces at Plymouth he was responsible for the excellent and imaginative design of the casualty department and while with the Marines he laid the bases for the medical support which proved so successful during the Falklands campaign. He served in the Korean War being mentioned in despatches and later saw service at Suez. He was promoted to Surgeon Captain in June 1969 and was appointed Medical Officer in Charge of Royal Naval Hospital Gibraltar from 1972 to 1975. He left the Service in 1977 to take up an appointment as medical officer to the DHSS to Gosforth where he made a great success of his second career.

He is survived by his wife Tonie and by three daughters and two sons.

Surgeon Rear Admiral George Augustus Binns CB died suddenly on 2 April 1990 at the age of 72.

George Augustus Binns was born on 23 January 1918, the son of a medical practitioner in Leicester. His main schooling was at Repton School where apart from achieving a creditable Matriculation it was noted that he was in the OTC from 1931 to 1936 and at one point was the Sergeant of the Machine Gun Platoon.

His medical training began in 1936 at St Bartholomew's Hospital London and he qualified MRCS LRCP in July 1942. His first appointment as a locum was as Casualty House Surgeon at the Luton and Dunstable Hospital where he stayed until the end of November 1942.

He was inducted into the Navy as a Probationary Temporary Surgeon Lieutenant RNVR on 4 December 1942. His first establishment was the Royal Naval Barracks Portsmouth, and he proceeded thence to *Daedalus* for courses of continuity arriving in *Condor* where he remained until June 1943 by which time he had dropped Probationary from his style of address. He was appointed to *Spaniard* and proceeded to Freetown West Africa there he shared with the Fleet Air Arm the [illegible] malaria and dysentery. No doubt as a consequence of his subsequently [illegible] praise for his attention to antimalarial control. On return two years later in 1945 then in rapid succession appointed to a succession of Naval Air Stations—*Jackdaw* Kent *Raven* and then *Heron* II by which time the global war was over.

In June 1946 he was granted an extended Service Commission and then joined *Mauritius* as part of the Pacific Fleet. It was while he was serving in this vessel a fast minelayer that he transferred to a Short Career Commission in the RN and was granted four months seniority in the rank of Surgeon Lieutenant in recognition of his civilian medical experience. A sojourn in Hong Kong followed as he was appointed to *Tamar* and then to *Sussex* in Squadron Medical Officer. This led to promotion to Acting Interim Surgeon Lieutenant Commander in August 1948.

The following years was important for two reasons. Firstly he transferred to the Permanent List in April 1949 and, in the September he married Miss Joan Whitaker. He was confirmed as a Surgeon Lieutenant Commander in 1950 having recently been both at *Fernbrake* for a month and then to *Unity* (another spell with the Fleet Air Arm) in the Clyde. He then proceeded in July 1951 to the Royal Naval Hospital Plymouth for ophthalmic training and he undertook on course until taking up an appointment at Chatham as a Specialist in Ophthalmology having recently obtained the Diploma in Ophthalmology at *Gannet* he replaced Rex Phillips.

Promoted Acting Interim Surgeon Commander he continued his ophthalmological career at Haslar before taking a trooper to HMS *Highflyer* at Trincomalee in November 1955 relieving Crawford Barras. Confirmed as Surgeon Commander while in what is now Sri Lanka he then returned in the *Empire Orwell* arriving on 4 December 1957 and almost immediately on 6 December being operated upon for appendicitis. Fortunately this was a traumatic discomfort so he was soon able to take up an appointment at *President* with the Admiralty Medical Board. In 1962 while at Haslar he was advanced to Senior Specialist in Ophthalmology and then made the bi then short a passage to succeed Peter Dunham as the Ophthalmologist at Haslar. On return from Malta he again resumed duties at the Admiralty Medical Board once again more vice Dunham and during this appointment he was promoted Surgeon Captain in June 1967. He then proceeded to *Fraser* vice McFin took, and from there he went on his travels again—to Gibraltar HMS *Rooke* and as MOH RNH Gosport.

Throughout this somewhat peripatetic existence he was always unobtrusively supported by Joan who when established in the Rock of Gibraltar made Land House not only a family home but also an oasis where Medical Officers of all seniorities found indeed tranquility and sympathetic ear. This happy sojourn post of homeliness was uprooted and transferred to the South west on the promotion of Surgeon Captain Binns to Surgeon Rear Admiral in charge of the Royal Naval Hospital Plymouth. The Admiral was made a

Queen's Honorary Surgeon in 1972 and was invested as a Commander of the Order of the Bath on his retirement in 1975. This heralded the end of an era for the hospital as he was the last officer of flag rank to have charge of RNH Plymouth. Since that time he maintained his contacts with the Royal Naval Medical Service as a member of the Naval Medical Compassionate Fund and also his activity as a member of the committee of the Royal Naval Club being a regular diner in the Painted Hall on the occasions of the Blood Red Dinner.

George Burns was never a flamboyant officer but he achieved his success by high endeavour, attention to detail and most important a very equable nature. He will be missed by all those who had the privilege to serve with and under him. Our deepest condolences are extended to his son a Commander in the Royal Navy, to his two daughters, and especially to Joan his wife who remained his talisman until the end.

We have recently learnt of the death of Surgeon Vice Admiral Sir Robert Pennefather KBE CB. Any personal reminiscences will be welcomed by the Editor.

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SERVICE NEWS

ROYAL NAVAL MEDICAL AND DENTAL OFFICERS

BIRTHDAY HONOURS 1990

Commander of the Order of the Bath
Surgeon Rear Admiral (D) D A Coppock

Commander of the Order of the British Empire
Surgeon Captain R J Carmichael

HONOURS

The Most Venerable Order of the Hospital of St John of Jerusalem

Officer (Brother)
Surgeon Commodore F R Wilkes MBE QHS

APPOINTMENTS AND PROMOTIONS

As Consultant Adviser in Occupational Medicine to MDG(N)
17 April 1990
Surgeon Captain J R Harrison

As Professor of Naval Occupational Medicine
13 February 1990
Surgeon Commander J J W Sykes

To Surgeon Lieutenant Commander
A G Hillary N J A King Tours

To Surgeon Lieutenant Commander (D)
J C S Killick

To Surgeon Lieutenant
C W Booth C J Hind D K Riden

To Acting Surgeon Lieutenant
J G Sharpley P D Edwards

HIGHER QUALIFICATIONS

Surgeon Commander T J R Francis—PhD
Surgeon Lieutenant Commander D N Jones—DRLOG
Surgeon Lieutenant Commander R Bruce—DCH
Surgeon Lieutenant Commander N A Hedger—MRCP
Surgeon Lieutenant Commander (D) A B C Maxwell—MGDS RCS(Edin)
Surgeon Lieutenant P S Ellis—MRCP
Surgeon Lieutenant (D) T J Ratledge—FDS RCS(Edin)

CONSULTANTS, SENIOR SPECIALISTS AND SPECIALISTS

The following professional appointments are announced

Consultants

Radiology
Surgeon Lieutenant Commander L J Jarvis—16 1 90

Senior Specialist

Otorhinolaryngology
Surgeon Lieutenant Commander H J Cox

Pathology
Surgeon Lieutenant Commander C Pipkin

Surgery
Surgeon Lieutenant Commander M M Scott

Specialist

Occupational Medicine
Surgeon Lieutenant Commander A G Hillary

AWARDS

Surgeon Commander P Litchfield has been awarded the quinquennial **Chadwick Trust Award** for his work in the preparation of a training package for managers involved in the implementation of COSHH

The **Arnall-Eldridge Prize** for 1989 has been jointly awarded to the following officers

Surgeon Commander M R O Connell
Surgeon Commander P I Raffaelli
Surgeon Commander M D Simmons

NEW ENTRIES

Surgeon Lieutenant Commander C R Pearson
Surgeon Lieutenants S S Cooke W J D Deans C R M Foster
Acting Surgeon Lieutenant S J Easterbrooke
Surgeon Sub Lieutenants D J Connor N G Fisher R M Gregory L J E Harding G A H Johnson S M Tellam (Miss) H D Williams

TRANSFERS TO FULL CAREER COMMISSION

Surgeon Commander N S Bevan
Surgeon Lieutenant Commander (D) P F Culwick
Surgeon Lieutenant Commander (D) R E Norris
Surgeon Lieutenant A W Lambert
Surgeon Lieutenant (D) M W Aston

PLACED ON EMERGENCY LIST

Surgeon Lieutenant Commander N J A King Tours
Surgeon Lieutenant Commander J N Walters
Surgeon Lieutenant Commander (D) J R Mann
Surgeon Lieutenant F J Mann
Surgeon Lieutenant M Unger

RETIREMENTS

Surgeon Rear Admiral (D) D A Coppack QHDS
Surgeon Captain J Bertram QHS
Surgeon Captain R J Carmichael
Surgeon Captain A J Rintoul
Surgeon Commander F M J Hiles OBE
Surgeon Commander (D) J H Harker
Surgeon Commander (D) M J Lovell
Surgeon Lieutenant G C G Shelford
Surgeon Lieutenant (D) I A Cross

MEDICAL SERVICES

BIRTHDAY HONOURS 1990

British Empire Medal
Chief Petty Officer Medical Assistant A White

CONFIRMED IN RANK

Sub Lieutenant T M McAusho

NEW ENTRIES

Acting Sub Lieutenants P Chilcott
W M Durning

RETIREMENTS

Lieutenant Commander K J Cuthbertson

QUEEN ALEXANDRA'S ROYAL NAVAL NURSING SERVICE

BIRTHDAY HONOURS 1990

Associate of the Royal Red Cross
Superintending Nursing Officer U M Winfield

PROMOTIONS

To Superintending Nursing Officer
P A Hogben

To Senior Nursing Officer
C M A Doughty P J Connell

NEW ENTRIES

Senior Nursing Officers C A Dane
P S Hall
Nursing Officer S J Spencer

WITHDRAWN ON COMPLETION OF SHORT CAREER COMMISSION

Senior Nursing Officer M C Manley

RETIREMENTS

Superintending Nursing Officer P H Smith
Superintending Nursing Officer J C Smith

ROYAL NAVAL RESERVE

BIRTHDAY HONOURS 1990

Officer of the Order of the British Empire
Surgeon Commander J K N Curr RD

HONOURS

The Most Venerable Order of the Hospital of St John of Jerusalem
Officer (Brother)
Surgeon Captain R J Berry RD (*Eaglet*)

APPOINTMENTS AND PROMOTIONS

As Principal Medical Officer (Reserves)
30 March 1990
Surgeon Commander T A Waterworth
(Forward)

As Captain Medical Training (Reserves)
6 April 1990
Surgeon Captain J M M Walsh (Surrey)

To Surgeon Commander (D)
C B Hayward (*Cullyra*)

To Surgeon Lieutenant Commander
D J Campbell (*Northwood*)
A P Griffiths (*Cerne*)
A L Wilkinson (*President*)

To Surgeon Lieutenant
A Naylor (*Flying Fox*)

To Probationary Acting Surgeon Lieutenant
P L Scott Mackie (*President*)

NEW ENTRIES
Surgeon Lieutenant Commander P D Clarke (*President*)
Surgeon Lieutenants G L Evans (*Sultan*)
C M Wilson (*Palamine*)
Probationary Surgeon Lieutenant
W Colquhoun-Flannery (*Hessey*)
Probationary Acting Surgeon Lieutenants (D)
I A Britain (*Claverhouse*)
J J Collis (*Cambria*) A M Jordan (*Final*)

CONFIRMED IN RANK
Surgeon Lieutenant E R Jago (*Eagle*)

REMOVED FROM ACTIVE LIST
Surgeon Lieutenant Commander G L Cooper (*Sussex*)

PLACED ON RETIRED LIST
Surgeon Captain D H Short (*Flying Fox*)
Surgeon Captain (D) H Connell (*President*)
Surgeon Commander H L Proctor (*Hessey*)
Surgeon Lieutenant Commander J P Reeves (*Wildfire*)
Surgeon Lieutenant Commander G E Stollard (*Cerne*)
Surgeon Lieutenant Commander (D) N F Martin (*Final*)
Surgeon Lieutenant Commander (D) I M Tinkler (*Forward*)
Acting Surgeon Lieutenant S R Hopkins (*Camperdown*)



The photograph shows Surgeon Commodore (D) Robinson (*right*) signing the supersession [illegible] Surgeon Rear Admiral (D) Coppock looking [illegible]

Surgeon Rear Admiral (D) D A Coppock QHDS DSLJ MSc BDS retired on 11 May 1990 having served as Director of Naval Dental Services for almost five years, half of which time was also spent as the first Royal Naval Dental Officer to wear the hat of Director of Defence Dental Services.

He has been relieved by Surgeon Commodore (D) B Robinson OSU MSc LDS(Dmth) as Director of Naval Dental Services and by Major General F E Ashenhurst QHDS MSc BDS as Director of Defence Dental Services.



Principal Nursing Officer [illegible] RRC QHNS QARNNS who was appointed Deputy Director Defence Nursing Services and Matron In Chief on 6 February 1990.



Surgeon Captain R J Carmichael Royal Navy retired on 30 March 1990 after six years as the Head of the Naval Radiological Protection Service and eight years as the Head of the Defence Radiological Protection Service. Here he is with his successor as HRDPS Surgeon Captain J K Harrison Royal Navy (*left*)



Surgeon Commander J J W Sykes Protects not Naval Occupational Medicine

Professor June K Lloyd Civil Consultant in Paediatrics to the Royal Navy has been created a **Dame of the Order of the British Empire**

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Tables and illustrations should be referred to in the text. Tables should be typed in double spacing on separate sheets. Figures should be professionally drawn, making due allowance for the appropriate reduction. Glossy black and white photographs should be submitted, unmounted, whenever possible. Titles and detailed explanations should be given in the legends which should be typed on a separate sheet.

References should be numbered consecutively in the order in which they are first mentioned in the text. At the end of the article the full list of references should give the names and initials of all authors (unless more than six, when only the first three should be given followed by *et al*.). The authors' names are followed by the title of the article, the title of the journal abbreviated according to the style of *Index Medicus*, year of publication, volume number and first and last page numbers. Titles of books should be followed by the place of publication, the publisher and the year, e.g.

> Soter NA, Wasserman SI, Austen KF. Cold urticaria: release into the circulation of histamine and eosinophil chemotactic factor of anaphylaxis during cold challenge. *N Engl J Med* 1976; **294**: 687–90.
>
> Oslet AG. *Complement: mechanisms and functions*. Englewood Cliffs: Prentice Hall, 1976.

1 The Vancouver style. *J Roy Naval Med Serv* 1979; **65**: 179.
2 International Committee of Medical Journal Editors. Uniform requirements for manuscripts submitted to biomedical journals. *Br Med J* 1982; **284**: 1766–70.

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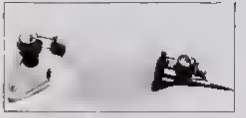
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Surgeon Rear Admiral David Askey Lammiman LVO QHS FFARCS



Surgeon Rear Admiral [illegible] Wyggeston School [illegible] and St Bartholomew's [illegible] 1967. He undertook [illegible] graduation [illegible] RNH Gosport [illegible] joining the Royal Navy [illegible] Surgeon Lieutenant [illegible].

Surgeon Rear Admiral [illegible] RNH Sultan [illegible] and Malta being [illegible] Surgeon Lieutenant [illegible] Submarine training to the Submarine Group based [illegible] HMNZS [illegible]. He returned to RNH Malta in 1969 and was promoted Surgeon Lieutenant Commander [illegible] on the list and remained in post until he was appointed to RNH Derriford [illegible] to RNH Plymouth. He was appointed to HM Yacht *Britannia* [illegible] Falkland War and returned to RNH Haslar in September 1982 [illegible] and joined the Medical Directorate General (Naval) in June 1985 [illegible]. He became the Medical Officer in Charge of RNH Plymouth in July 1986 [illegible] 1990. He was promoted Surgeon Rear Admiral on 4 January 1989 on [illegible] Surgeon Rear Admiral (Support Medical Services). He became Deputy Surgeon General [illegible] (Naval) on 1 October 1990.

Surgeon Rear Admiral Lammiman was awarded [illegible] in St Helens on the Isle of Wight. His interests include fly fishing, golf [illegible]

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Practical Occupational Medicine: Astronaut Selection; A Diver's perspective from 300 m below sea level to 300 km above

G J Brooks

Summary

In 1989 public selection of a team of four astronauts for the Anglo Soviet Juno space mission took place. In this article the author a Navy Medical Officer relates his experiences of taking part and discusses the rationale behind the exhaustive protocol of medical investigations involved

Astronaut Selection Practical Experience

WHEN I was 10 years old I applied to the Ministry of Aviation to become an astronaut I received a sympathetic reply explaining that Britain did not have a manned space flight programme and that perhaps I was in any case a little young It was suggested however that if I worked hard and joined the armed forces I might be well placed if the opportunity ever arose

Many years later as the political climate in Europe changed it became possible to purchase payload and astronaut space on Soviet Soyuz launches The Juno mission was conceived with the object of putting the first British astronaut into space to spend a week on board the Mir space station performing microgravity research There would be no government finance the cost would be met entirely through sponsorship Plans were made to recruit a member of the public as the astronaut

On 2nd July 1989 I read an advertisement in the *Times* which was headed Astronaut wanted no experience necessary Further scrutiny revealed that the successful space person would be a scientist (even medical) between the ages of 20 and 40 Without hesitation I phoned the hot line passed the brief interview and was sent an application form

The form enquired about previous practical experimental work language capability employment and medical history We were asked to describe previous adventures and any media encounters Finally we were asked to prepare the case for our own selection

I described my career to date as a Naval Medical Officer which has included being on a ship that was sunk in the Falklands conflict experimental diving in the Arctic and to 300 m diving physiology research into the use of expert systems in medicine parachuting submersible operations submarine escape and experience as an occupational medicine trainee The form was dispatched with a copy of the reply to my application sent 22 years previously

Although I considered that my experience might well have prepared me for becoming a scientist in space my main concerns in applying were that my language skills consisting of unrefreshed school French might let me down and that impending vasectomy might impinge upon my ability to maintain a reasonable level of fitness I decided to revise French (rather than attempt Russian) and that the family was large enough

The day before Christine (my wife) and I were due to motorcycle North to the western Isles on leave I phoned the Juno office I was

Surgeon Lieutenant Commander Brooks is presently seconded to the Juno Project and Bunnel Institute for Bioengineering.

advised that there had been some 13 000 applications and that all successful candidates had been notified. I looked out my copy of the form with intent to do it mischief but was distracted by a phone call from the Juno medical director's secretary (from a different establishment) who asked when I could attend for screening. We cut the holiday short and I travelled down for a day of psychological and medical assessment. The psychological tests, described as a senior executive screening included timed tests of IQ, mechanical reasoning (it is rumoured that many of the systems on Mir require frequent repair), spatial perception and stressed accuracy. We were also given personality and psychological health screening tests and a dexterity test.

At the end of the morning session there was an unintentional but equally demanding timed test for our ability to cross London to the BUPA screening centre. Once there we received a standard company health check with the addition of a treadmill test of VO_2max and various X-rays. I was interviewed after the treadmill test by a Juno director who asked whether the family would be prepared to move to Moscow and what the reaction of the RN had been to my application.

The RN knew nothing of my application (officially) as I had calculated that the odds against my progression to the next round would most likely produce the embarrassing result of any official application being considered by the RN long after I had been rejected. Any thoughts of prolonging my silence were cut short by the announcement that, through an unfortunate error the top page of every (in strict confidence) application had been delivered into the hands of the press.

Within a few hours of returning to Gosport the first reporter called. Later that day a photograph was taken for the evening paper. I decided that it would be easier to comply with the editor's request that I stand on my head rather than be caught sheepishly peering through the letter box. The next day I attempted to explain my actions to the powers that be and was initially met with the standard response that I should write something in a pack (a system for filing paperwork under headings). Later on, my persistence produced expressions of displeasure at my obvious inability to follow correct astronaut application procedures! The ticking off was, however tempered with a cautious temporary stamp of approval. My case and that of another Naval Officer had been forwarded to the highest authorities for consideration.

I received direction that I should not mention, if at all possible, that I was a Naval Officer nor describe any experience that I had had in the Service as there might well turn out to be a problem with the acceptability of mission sponsors. If I had ever wanted to present the image of a rugged experienced macho explorer scientist the time had passed. The local newspaper described me as 'flash Gordon', a family man from Gosport. My sense of fun got the better of me and in the JUNO spirit of commercial enterprise I persuaded a local manufacturer to print a flash (in Russian) iceshirt for me to wear in a forthcoming TV interview. Whether wisely or not I stood out from three other interviewed southerners who all wore their best but sober suits.



Fig 1 The four astronauts outside the Lenin mausoleum in Red Square, Moscow, from left to right: Clive Smith, Timothy Mace, the author, Helen Sharman.

A few weeks later I received a call announcing my progress to the next round. The 35 remaining candidates were summoned to Brunel University to eye each other up and to be eyed up over drinks by the JUNO team. We were photographed and some given video interviews. Details of the mission were presented and an outline given of the experimental programme that would be conducted during the eight day mission. Later at dinner by an extraordinary coincidence, I found myself sitting opposite Helen Sharman who was herself sitting next to Timothy Mace. (These two were in fact the candidates finally selected as primary crew.)

The next day we were driven to the Royal

Aeronautical Society where we sat in our JUNO wear and listened intently to a briefing on forthcoming medical tests Over lunch we had our first exposure to the mass media It became obvious that the main interest was split between the remaining female candidates and a couple who had both managed to be selected

The next week I reported back to the selection agency for further and more detailed psychological testing. We were given personality tests and a test of motivation Our ability to rapidly assimilate and argue the value of data was challenged in face to face confrontation There were further papers that searched for the symptoms of psychological illness The day ended with an individual feedback session The findings were plotted on a bar graph where the ideal appeared as a diagonal division from high maturity at the top of the chart to low instability at the bottom My interviewer probed potential problem areas where there were irregularities in the plot. A distinct kink was discovered at the level of the 'go for it factor' which had caused full scale deviation I was advised that this could well have caused problems if my stability had not also been high He indicated that like many other of the candidates I had a low 'Killer factor' (presumably reasonable in a medical practitioner) which was an attribute commonly found in failed company directors My presentation and its defence had been good and I was told that I was adaptable and could probably be trained for whatever was required The final discussion revolved around motivation and my expectation of any mystic or religious experiences in space The sight of the world below has tempted previous astronauts to consider the insignificance of mankind and its problems Tendencies to such philosophical musings were frowned upon

My psychiatric illness score turned out to be zero but out of interest I enquired of the acceptable limits and was told that several candidates had been rejected for admitting to suicidal tendencies !

The next week I found myself booked into a London hotel for five days of bed and borborygmi A search of the register revealed several familiar names We met for discussions about locations of clinics (many in the Harley St area) and meanings of terminology in our programme The following tests were due to be performed upper and lower GI endoscopy and Barium studies ENT examination including calorie stimulation examination by a dentist and by an ophthalmologist stressed and unstressed EEG including low PO2 various X rays prostate massage ultrasound of the prostate heart carotids and abdomen glucose tolerance test and not forgetting faecal analysis by post

I had decided that apart from prostate massage upper GI endoscopy was likely to cause the most suffering I remembered the bad old days watching tubes being forced down the throats of gagging and struggling victims On the day the diazepam had the desired effect and the whole process seemed to be completed rapidly without discomfort However the ENT surgeon performing calorie stimulation shortly afterwards was most surprised at my ability to relax (the test was repeated later)

Sigmoidoscopy was far from pleasant Whilst waiting in the queue I was aware of thumps and shouts emanating from the examination room On drawing up my knees I was advised that I could scream if I wished The problem was associated with pumping of air into the bowel which was necessary for the surgeon to get a good view The effect was immediate extreme colic that eased after several seconds to a dull ache

A similar experience occurred with the barium enema as it was pumped in A general problem with barium studies was the tenacity with which the substance resisted all attempts of its disposal through toilet flushing The preparation for GI studies required the consumption of laxatives and insertion of enemas Through the night in the hotel the JUNO corridor reverberated with the breaking of wind and repeated water closet operation On the street candidates could be identified by their clenched gluteal walk whilst attempting to make it to the clinic

Soviet medicine sets great store by the value of urine specific gravity which was found to be exceedingly low in many of the candidates when measured during the week of intensive investigation BUPA guidelines issued with our programmes recommended a high fluid intake during periods of increased bowel activity I made the mistake of pointing this out to other candidates and was later awarded black marks for tampering with candidates (including my own) fluid balance !

Another fascinating test involved exposure to a reduced partial pressure of oxygen for 15 minutes EEG was recorded as were our vital signs An anaesthetist stood by I was told that some candidates had dozed off I certainly

noticed a degradation in my reaction time We all suffered acute cyanosis.

Selection involved rapid attrition sudden shocks and survival of the fittest One girl travelled the length of the country to attend an appointment only to discover a note declaring that she was no longer required At least one candidate was given an appointment for sigmoidoscopy after barium enema and discovered the delights of repeated washout

The week had a great bonding effect on what is now the membership of the 35 club The chat was reminiscent of that found amongst first year medical students revelling in the opportunity to point out statistics about their bodies that would not normally be discussed in polite conversation I returned to work knowing far more about the practical aspects of the occupation of medicine than is ever taught in medical school

Media interest continued to grow and I received daily requests for interviews One local radio reporter decided that his listeners would like to know how a potential astronaut spends his week We decided that an underwater interview might be quite challenging and there was talk of chatting to patients and nurses during one of my routine clinics The MoD response was consistent Approval was granted with the provision that no MoD equipment was used and that no MoD personnel were interviewed The reporter was not put off He followed me to the local swimming pool and later on to a Chinese restaurant The proprietor appeared bemused as I was asked about the benefits of prawn chow mein in a spaceman s diet especially when listeners were told by the interviewer that only protein tablets would be available in space

The next venue for reunion of the surviving candidates was IAM Farnborough Here we were to be exposed to some of the major physiological stresses of space flight I was overjoyed to be selected and pleased to find that two other military candidates had also found their way into the final 18 I looked forward to Farnborough and hoped that there might even be pleasurable underwater simulations of microgravity

The IAM testing occurred over two days The programme included centrifuge tests to 8 Gx and 5 Gz tests of susceptibility to motion sickness altitude test and feet down tilt and lower body negative pressure to measure circulatory resilience Thermography was performed and calorie testing was repeated

The two most demanding tests occurred on the centrifuge and the rotating chair The massive centrifuge is located in the heart of its own building The arm looks like part of the Forth road bridge at each end of which is mounted a cockpit unit that could have come from a dismantled World War II fighter One seat is inclined to provide Gx exposure and the other upright for Gz The lesser of the two evils is Gx on which we trained first Candidates were flattened against the seat back rest and experienced symptoms of moderate chest pain and respiratory distress at high G levels We were trained to perform an effective anti-G straining manoeuvre which would be of particular value in the Gz exposure to follow In Gz exposure, gravity opposes carotid artery pressure as blood is flung towards the feet The result can be blackout usually preceded by tunnelling of vision Our task was to successfully complete exposure to 5 Gz without blackout In the event several candidates including another of the military blacked out on first attempt

Gravitational forces in the order of the 6 to 8 G and even higher have been recorded on Soyuz flights in the minutes following take off and during re-entry Space sickness resulting from confusion of the balance mechanism in microgravity has been reported in some 50% of astronauts and is normally at its worst during the first few days. The provocative sensation has been described as being similar to that of continuous free fall which was probably music to the ears of one candidate who was a free fall parachute champion He did not survive long however on his first attempt at the Coriolis chair

The Coriolis chair was the most feared of the motion sickness tests The Soviet protocol called for it to run at greater rpm than its maximum design speed and the bearings certainly squeaked as candidates neared the end of the test sequence The stated end point for the test was vomiting I was determined that the RAF would not induce this member of the Senior Service to so disgrace himself Coriolis stimulation was achieved by repetitive movements of the head from being cradled in between the knees over the sick bag to vertical against the head rest During this manoeuvre the chair was rotated The rotation speed was increased and the direction reversed as the test proceeded Two sets of semicircular canals sent confusing and nauseating signals to the brain I survived to the end as did two other candidates

One survivor of the chair had watched me performing the test silently willing me to fail When I did not oblige he received a taste of his own medicine Our killer factors must certainly have been low He had a first class Naval beard and I had previously suspected him of being the other sailor He was not as it turned out but this did not stop us taking the sound military advice that we should refrain from travel until gyros had settled With undisguised smugness at our success in what we thought was the last test of the protocol we recuperated at a nearby bar

The elation did not last long. Days later it was announced that certain excellent candidates who might be excluded on the Farnborough results would be allowed to repeat tests in order to assess whether adaptation could be demonstrated with further exposure

Following analysis of the last set of results 15 astronaut hopefuls were passed fit by the British medical selectors Ten Soviet aviation and space medicine experts flew in to review the results. They scrutinised the mass of documents for two days and raised objections to most candidates. They actually had the onerous task of having to convince the final medical board in Moscow of any selected candidates fitness

Whilst serving as duty MOOG at HMS *Nelson* one night I received a call from the JUNO medical director advising me that a number of serious doubts had been raised concerning my fitness The SG of my urine had been found to be low (as previously described) My GTT bordered on being abnormal The 24-hour ECG showed nocturnal bradycardia and the skull X ray had revealed a double base to my pituitary fossa I was to sit the least a little taken aback by these revelations as I had been passed by the British doctors and previously considered myself to be in good health

The Soviets had agreed to review my case and I was to present myself to the panel equipped with the results of 24 hour urine collection The Soviet doctors supervised re examination of the remaining candidates ENT visual and oral health We were each given a detailed physical examination Tomograms of my pituitary fossa were performed During each phase of examination questioning was carried out through interpreters My flagging spirits were revived when the surgeon suddenly announced after a long chat that although it was highly irregular for him to discuss suitability with candidates he wanted me to fly The host of medical problems seemed to be put aside one by one

The skull X-ray result still posed a problem I enquired whether a brain scan would help the panel to reach a decision They told me that such a scan would eventually be required and that it would be an advantage to obtain it in the UK.

One test from the Soviet protocol had not been performed IVF results were required before candidates could advance further It was apparent that difficulties were being encountered in having these examinations performed in time I rashly volunteered to make enquiries at Haslar The BUPA medical director provided me with referrals for CAT scan and IVP

The IVP was performed at Haslar according to Soviet specifications but with the inclusion of compression films A CAT scan was arranged on the basis of assessing my fitness to dive The films arrived on time with the penalty of departing before typed reports were available I scored a fair number of black marks which increased when the Soviets were apparently confounded by the appearances of the compression films from which the identifying marks had disappeared A mental flag was raised when the CAT scan was passed as being marginal I discussed the results with colleagues and other experts and decided to continue

Despite the problems I was passed by the Soviets as being fit The day the announcement was due a documentary team descended upon the house to interview the family and film the receipt of the all important phone call On two occasions the call arrived but I was not allowed to answer because the camera crew was not in position Finally I received the good news that I was to attend for further briefing in London Time was short We decided that the family unit should put in an appearance so we loaded up the car and departed into the unknown

The car decided to play up and we eventually arrived trailing an exhaust pipe We were ushered into a reception room at the PR company's headquarters and offered drinks I took a beer and started to unwind It was a mistake Once the four had arrived we were summoned into a side room one by one for some media training This turned out to be nothing of the sort but rather an entirely serious test of our attitudes to the project and life in general It was a horrifying trial where questions such as 'when did you last cry?' were asked by sombre faced media consultants whilst the answers were recorded on video I felt unable to open up my heart on this occasion

and gave quite flippant responses In a few minutes it was over as probably was my chance of being selected (well that's space business!) The film was later shown to the board of directors of the Jnno mission

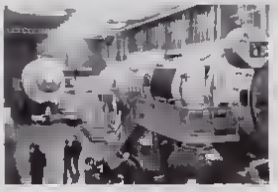
We stayed in London overnight in first class surroundings The children were shell shocked and played np Christme spent most of the evening reading the not act whilst I had a first glimpse of the draft astronaut's contract We were advised that we would depart for Moscow the following week, by which time contracts must be signed The next day there was a major press conference at the Savoy The Brooks family took one large limousine whilst the other three candidates were consigned to another The selectors must have had a glimpse of what they might be letting themselves in for in taking on a family man After the excitement of the day which the children had started to enjoy we were finally dumped back at the car park where a dejected Volvo awaited us

I advised the MoD of the terms of the astronant contract and sought legal advice The contract was strongly worded and its terms almost inhuman verging on slavery (which I was advised might not be legally binding)

A few days later the candidates were invited back to London for interview I felt that I acquitted myself quite well a feeling that was unfortunately not shared by at least one important interview board member What was required was an unquestioning positive attitude and unbridled joy at selection My attempts at challenging responses fell upon deaf ears

The few remaining days before departure were filled with media interviews The phone rang incessantly The attention was not particularly stressful and the media questions normally quite straightfoward The documentary team joined us for in-flight interviews After checking through Soviet customs we were pounced on by ITV who wanted our views on what it was like to be in Moscow!

We were soon entrenched in Hospital number 6 We had separate rooms in a ward reserved for us There was a dining area and a lounge We were attended by ladies who served our meals and nursing staff who regularly took our temperatures and pulse rates We were advised that the food was the same for all patients and apart from a certain predictability was quite nutritions We attempted exercise by running round the compound The doctors were concerned that this behaviour might predispose us to viral infection and we were given



A glimpse of full size Soviet Star City

strict instructions regarding the minimum number of layers of clothing that must be worn

Each day one or more Soviet doctors would visit us to check previous findings One day we were required to give blood The phlebotomist approached me with a set of washed needles and 24 test tubes He demonstrated an interesting manoeuvre in which he applied a tourniquet extended my arm and then inserted a needle The resulting jet was caught in a poised test tube held underneath Luckily only six of the tubes were for me

As time went on it became obvious that some rather unusual blood pressure recordings were being entered into the daily record book Knowing the attention to detail that had occurred with other measurements I resolved to discover the cause I borrowed the nurse's stethoscope and rendered it temporarily useless by filling it with cotton wool She was still able to produce her normal pattern of readings In the few hours that I was waiting to retrieve the instrument and explain my worries to the nurse the deed was discovered by the psychiatrist who voiced his concern In the same interview that he chastised my behaviour he pointed out a few saving graces Apparently I had revealed evidence of a compassionate nature, something understood to be a Russian characteristic and quite unexpected amongst the representatives of capitalism

The day of reckoning drew near We all underwent thorough examinations and I was sent for repeat echocardiography An unusual but clinically insignificant sound had been detected I was able to examine the wealth of modern facilities available at the cardiac institute



Fig 3 But the cosmonaut fli[illegible] M[illegible] n me of these" The guide indicates a [illegible] [illegible]sule

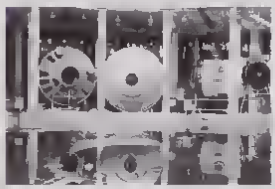


Fig 4 Elements of Mir [illegible] m[illegible]rography simulation tank

Twenty-four hour urine collection was a favoured test and I advised the others on the exact amount of urine that might be expected Unfortunately it was usually me that was caught out On the penultimate collection I adjusted fluid intake to prepare me for a morning sample that would bring the total up to an average volume Sample collection was due at 0800 but on searching at 0700 I found that the container had already gone The volume was found to be unusually low

At last the medical commission met to decide fitness The multitude of doctors split into groups each representing a discipline We were moved round the firms one by one The aerologist examined me stated that my CAT scan was acceptable and mused that it would be marvellous if I could make the transition from undersea to space experience The psychiatrist wished me luck and announced that he had no objections The surgeon pronounced me fit and offered some flattering remarks He said that he hoped that I would be chosen but knew that there might still be a cardiac problem The physician was next The members of his team scratched for murmurs He made no comment on my fitness The final port of call was the ENT surgeon who examined me briefly then pronounced that my tonsils were enlarged and would need to come out I asked hopefully (in dislocated Russian) if it could be done the next day but with a smile I was dismissed

The board met to consider its verdict and we were called in one by one On this occasion I was last to put in an appearance Some of the previous candidates had had problems and there had been fierce argument In my case there was no such debate It was announced that I was temporarily unfit due to tonsillar enlargement The news came as a shock and left me bemused Rejection on the basis of enlarged tonsils was the last thing that I had expected although I recalled a remark of the medical director that tonsillar swelling was often used as an excuse where candidates were unsuitable

A little later I was able to question some of the Soviet doctors during the post board celebration Genuine concern had apparently been expressed and related to an association between nocturnal bradycardia and slightly enlarged tonsils This had been deemed to constitute tonsillo cardiac syndrome I asked whether it was worth continuing I was told that I should not bear a grudge against any individual and that many things could happen in the year that I would be a reserve I noted these mysterious words but made nothing of them at the time

The media were advised not to broadcast the board results to enable the announcement of the final two to be made live on a type of game

show like programme. Following the announcement of Helen and Tim's success the media machine paused for one final bows and then moved on in pursuit of the survivors.

MEDICAL DISCUSSION: WHO IS FIT FOR SPACE?

A rule of thumb in determining the fitness of potential divers has been: if in doubt leave out. Standards of fitness are difficult to define when the hazards of the environment within which man intends to work are incompletely understood. Despite the 30-year availability of appropriate technology, high launch costs have limited the human experience of space flight. In the last decade astronauts and cosmonauts have spent months at a time in space. Even so only a small population has experienced the physiological effects of the environment. There are several major factors that appear to have been taken into consideration in the evolution of current standards. These relate to particular physiological stresses encountered during launch, microgravity and re-entry, to the remoteness of medical facilities and the necessity for the astronaut to be able to perform all required tasks throughout the mission.

General Fitness

There is evidence that a blanket testing philosophy has been adopted in an attempt to select candidates that have no detectable medical defects and therefore minimal chance of jeopardising, through ill health, the extensive training programme preceding a mission or the mission itself. This approach can create problems. It would not be unreasonable to suggest that virtually everybody has some detectable medical abnormality and that as more tests are applied the likelihood of detection increases. In the case of Juno selection, all four of the final candidates had abnormalities.[1] The costly screening exercise requires that criteria of exclusion have to be defined for all possible test results combinations, a task that is unlikely to be matched by available human expertise.

Specific Fitness

A more logical approach, especially for crew who are not career astronauts, is perhaps to tackle the problem in terms of moderate general fitness with investigative effort directed towards known hazards and effects.[2]

The circulatory system is stressed in various ways during space flight. The stress of launch produces tachycardia. Exposure to increased G forces can diminish lung perfusion and affect cerebral blood flow. Anti G straining manoeuvres are designed to ensure transient hypertension. In microgravity normally dependent fluid in the legs becomes a burden to the thoracic circulation. Arrhythmias may develop during circulatory stabilisation. Adaptation to microgravity reduces blood volume and red cell mass, which then causes circulatory stress on return to Earth.

The locomotor system suffers during microgravity exposure through diminished loaded exercise with resultant osteoporosis and muscle wasting. The effects are similar to those produced by prolonged bedrest and can be modified by exercise programmes in space.

Restricted fluid intake and increased skeletal calcium loss can predispose to renal calculi formation.

The humid and recycled environment of space stations could predispose to skin and respiratory infection especially as there is also suppression of the immune system.

There are also dysbaric effects that might be encountered during EVA and emergency situations.

Space sickness affects more than 50% of astronauts in the early days of a mission despite rigorous ground based provocative motion sickness testing. In such cases it becomes difficult to modify selection procedures as the only practical experience resides with a population who are resistant to stimuli that poorly simulate those likely to be experienced.

These factors as well as others such as consideration of the implications of radiation exposure during long term space flight have effected the emphasis placed on specific tests.

Expertise

A third influence upon fitness criteria has been experience gained from specific problems. Tonsillar enlargement or its history has been a particular concern of the Soviet doctors presumably because of some past incident. The presence of an appendix on the other hand does not (yet) affect selection.

COMMENT AND CONCLUSIONS

Screening

Current medical screening programmes for astronaut selection are extensive and expensive. If the standards were to be maintained then very few members of the general population would ever have the chance of space flight.

Much of the emphasis within the standards can be attributed to particular medical concerns relating to current mission profiles

In the future the introduction of space planes and gravity simulation in space should lead to a reduction in the cost of missions and significantly reduce the number of criteria of fitness that a potential astronaut or cosmonaut would have to meet before being passed fit to fly This transition is essential if we are ever to leave the age of pioneering flights behind us

Experience

I am grateful to the MoD for allowing me the opportunity to take part in the Juno mission which has allowed me a marvellous insight into a world that is far removed from normal Naval society The domain has included life in the public eye exploration on the frontiers of science marketing public relations international relations and an acquisition of knowledge in a new branch of medical expertise Much of this has been of little interest to the media who were programmed to view the event in terms of a race with one winner and 12999 losers Following the announcement of the two who would be trained in the Soviet Union a reporter from a major newspaper contacted me to find out my views on being a failure The response was quite straightforward in that I did not recognise his viewpoint Many candidates have been inspired by the progress that they made and have found new strengths with which to make more of their lives On the other hand I am quite sure that many others have found their experiences to be most unsettling

Epilogue

In recent times the Juno mission has been plagued with financial and other problems The faces have changed but those that remain have shed much of the other worldliness that has marred this adventure in private enterprise space travel I am on leave from the RN for the duration of the project The Navy has kindly removed my tonsils Clive Smith (the other reserve) and I have been dealing with the logistics of space flight and the performance of microgravity research We have been involved with fund raising and mission publicity A rewarding part of our work has been lecturing at educational establishments and answering questions thrown up by the stimulated imaginings of young listeners We have learnt the basics of the Russian language in a two-month intensive course Our main tasking however is as specialist scientists and reserve astronauts We hope that our efforts will result in the conduct of a professional and scientifically profitable mission Such success might favourably increase the chance that a future flight will eventually satisfy each of our extra terrestrial ambitions

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Journal of the Royal Naval Medical Service
75th Anniversary

By now subscribers should have received a facsimile copy of the first issue of the Journal of the Royal Naval Medical Service published in January 1915. The Editorial Committee of the Journal has chosen to celebrate the 75th Anniversary by this method and is indebted to Messrs Smith Kline and French for making it possible.

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Expedition 'Idraren Draren'

L P Yeoman

Summary

In May 1990 a team of 12 personnel from the Royal Naval Medical Service flew to Marrakech and were then transported by truck to the village of Imlil to commence a 12 day trek into the High Atlas Mountains with the primary aim of ascending the summit of Mount Toubkal and encircling the Toubkal Massif. It was then the intention to get off the tourist tracks and to experience life among the Berber tribes and to trek part of the high Atlas range.

INTRODUCTION

In November 1988 I perceived the idea of the first major expedition involving the nurses and medical branch ratings of the RN Medical Service and embarked upon planning and organising a venture which would be remembered by all participants. The planning phase was most difficult in that there were very few past expedition reports to refer to and the delegation of duties was complicated by the casualty rate of volunteers. However not to be deterred there followed a year of planning and organisation in form of logistics and communication.

PERSONNEL

The aim of the expedition was to include the ordinarily fit person without any great mountaineering skills with the intention of introducing them to adventurous training of the highest calibre. At the same time certain members were included for planning and safety purposes. Ages ranged from 19 to 50 years.

Chief Petty Officer Medical Assistant Yeoman is currently drafted to HMS *Drake*.

PREPARATION

Diplomatic

Although Diplomatic Clearance had been requested and received from the British Embassy in plenty of time I was astonished to receive a phone call from the British Defence Attaché in Rabat 48 hours prior to our departure stating that permission to enter and trek in Morocco had ben denied even though trekking permits were not necessary. A few frantic phone calls from Plymouth to and from Rabat persuaded the Defence Attaché to allow us to proceed but with the knowledge that we might be returned immediately!!

Finance

A sketch estimate of costings was completed giving an idea of possible income and expenditure. Personal contributions were received and efforts commenced to procure grants and funds from various organisations and firms. Thankfully our venture was received most favourably and funds accumulated in a high interest account.

Medical

The team embarked upon a vaccination regime including polio tetanus typhoid meningococcal meningitis, rabies and hepatitis A several months prior to departure. A fairly comprehensive medical kit was arranged which included assorted dressing materials cleansing solutions antibiotics suture equipment and local anaesthetic. Numerous creams of varying sorts were carried to counteract the many forms of creepy crawlies which would be encountered and in view of the isolated locations a couple of bottles of infusion fluid and pain killing drugs were carried.

Pre trek training

Due to difficulties in getting everybody together at any one time team fitness was left very much to the individual although efforts were made to spend weekends under canvas in mountainous regions and to teach and learn the art of camperaft Weekends spent in the Lake District and Brecon Beacons were useful but by no means compared with what we were to encounter in the High Atlas Mountains

TRAVEL

In view of the inexperienced members of the team it was decided to send an advance party of three a few days beforehand to investigate the start point, arrange mules and porters and accommodation and to purchase any supplementary foodstuffs necessary Despite the diplomatic difficulties encountered 48 hours earlier our entry through Marrakech airport was uneventful as was that of the main party

Overland travel with a back up vehicle had been considered but was discarded due to various cost and logistic difficulties and air travel via Gibraltar and train from Tangiers was also eliminated again because of time and cost The best method of transport to our start point was air passage with Royal Air Maroc airlines with transport from Marrakech to the roadside village of Asni by large six seater Grande Taxis and thereafter by truck into the mountains arriving at the lovely village of Imlil

THE TREK

The early summer in the UK assisted the team s climatic transition to the hot and semi climate of Marrakech The weather was to remain in the high temperatures with increasing and decreasing humidity depending on the height gained or lost The overnight stay in Imlil was most pleasant and cooler at 6000 ft but with the atmosphere noticeably richer The ascent the following day was difficult and long, especially as we had decided to miss out one overnight stop and to make straight for the Neltner Refuge (3207 m) at the foot of Mount Toubkal The refuge was comfortable but crowded with French and German and some Dutch and English trekkers, but it enabled us to have a good night s rest before our early morning departure up the snow fields of the slopes of Mount Toubkal Ice axes and crampons were useful but a great deal of determination and effort was required The ascent involved much snow but with patches of scree and boulder formations



Fig. 1 Djemaa el Fna Square Marrakech



Fig. 2 Water carriers in Djemaa el Fna Square

It was indeed hard work but most pleasant on reaching the summit at 4167 m with magnificent views out towards the Sahara Desert and

distant mountain ranges The absence of sharp peaks detracted slightly from the view but at this height we certainly felt on top of the world The descent was more pleasurable with most of the team sliding down the snow fields on their rucksacks using their ice axe as a brake—most exhilarating!



Fig 3 A typical Berber mountain village Mount Angour in the background

The evening was spent chatting about the marvels of high mountain ranges of views never experienced before and indeed the arduous trekking which lay ahead The early morning departure from Neltner was in the shadows of several 4000 m peaks along the Upper Mizane Valley Several ice and snow fields had to be traversed in zig zag formation which was most difficult, hard work and quite exciting. Reaching the Tizi n Ounnam s Col was most pleasant with the sun shining and further magnificent views of the far distant Lake Ifni in the valley below One of the porters took charge of one of the girls introducing her to the skills of scree running—she has never come down a mountain so fast

The thought of a swim in the jade green lake was most inviting and after pitching tents on difficult rocky ground everyone donned bathing suits to swim and bathe in the warm water—in complete contrast to the icy cold rivers experienced so far With the lovely lake in front and surrounded on all sides by high mountains the experience was most delightful Only the movement of the Berber porters in their stony bivouacs was heard or the far distant singing of Berber children in remote mountain hamlets It was a most peaceful existence

The next few stages of the trek comprised many ascents and descents along dusty trails and through high mountain Berber villages in a very hot and dusty energy sapping climate All team members suffered the horrors of tummy upsets even though we were using dehydrated foodstuffs Water was always filtered through an expensive Katadyn Water Filter even before boiling—the altitude preventing the water reaching maximum temperature for the eradication of bugs The decision to use mules as transport for equipment was a good idea as it was always thought they could be used in cases of illness or injury The girls used the transport happily on one or two days when stricken down



Fig 4 Mules and muleteers Mount Toubkal in the background

However as each day passed there were more experiences and sights to be appreciated and the team were enjoying the trek despite the illness and the arduous nature of the terrain A rest day was spent in the beautiful Ourika Valley at Setti Fatima provisions were procured and instead of the dehydrated food a pot mess of fresh vegetables was made An absolute luxury of a meal!

Again the planning of a rest day had been essential and morale and spirits were revived for the walk along this most beautiful valley to embark on the last leg of the journey On leaving the Setti Fatima a hard slog up the mountainside to gain height again was necessary before reaching the Yagour Plateau This plateau should be on everyone's itinerary and especially between October and June Local laws dictate that grazing of goats and cattle is forbidden during these months for the meadows to grow and flourish a law which would be useful in England The meadows were in



Fig 5 A mountain pass Mount Angour in the background



Fig 6 The bearded mountain man Team leader centre

abundance of wildlife flora and fauna of every description Hundreds of grasshoppers would jump from underfoot as each step was taken red poppies and flowers of every colour were everywhere to be seen and smelt

The two days spent on the Yagour Plateau were most peaceful and a most delightful way to finish a mountain trek During the whole trekking phase very few other trekkers had been seen—we had succeeded in our quest to get off the tourist track and each moment was well worth the effort and determination Each person had experienced sights and sounds they might never encounter again It is hoped that this taste of adventure would encourage them to embark on another exped sometime somewhere

In order to add another dimension to the trek and to get out of Marrakech we travelled down through the Anti Atlas Range of mountains to Agadir to revive our energy before flying back to London and on to Plymouth

Typically it was raining as we flew into London Heathrow and we did look peculiar in our shorts and t-shirts sporting quite nice tans and thunderous muscly thighs!

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The Cambridge Audit System in a Service Hospital

R F Dale

Abstract

The introduction of clinical audit into the environment of service hospitals poses particular problems. Experience at RNH Plymouth has shown that one approach the adoption of the Cambridge Audit System has succeeded in overcoming certain administrative hurdles and has confirmed the advantages that can accrue from introducing a clinical audit based around a computer system.

INTRODUCTION

THE requirement for doctors to audit their work has become an issue which cannot be ignored there are both professional and political pressures forcing clinicians to adopt clinical audit and, therefore to examine the methods of running such an audit. The combination of pressure from the various Royal Colleges and from the Department of Health through the White paper Working for Patients has made audit mandatory for our colleagues in the NHS In the Royal Navy with the Royal Colleges emphasising the necessity of audit becoming part and parcel of the training of junior staff in clinical medicine audit has become mandatory too There is a significant body of opinion within the profession that believes that clinical audit is a valuable process which will improve the care of patients and also improve training standards that by examining the pattern of work the complication rates met and such matters as the length of stay of patients an improvement in the methods used to treat patients will ensue This has been recognised by the Royal Naval Medical Education Committee and clinical audit has become a major item under consideration by that committee

Whether we agree with audit or not it is with us and here to stay In reality we already do collect and analyse our work albeit in a rather crude way The annual reports produced by departments and units along with the central recording of data by Med Stats could be said to represent an audit of work However the spirit of the new ascendancy of audit lies with the concept that it should be a continuous process of professional self-evaluation intimately concerned with assessing quality of the care of patients and the quality of the training of junior staff This is distinct from the economic or financial approach which simply looks at the cost efficiency and the amount of work done by an individual unit For many these two concepts tend to get blurred and the altruistic professional viewpoint becomes debased by the pragmatic economic necessities of life The fact is the two concepts cannot be divorced and can benefit from one another

The benefits of audit are not easy to define though the continued decline in Maternal and Perinatal Deaths and complications is related to one of the longest running clinical audits It is one thing to accept that audit is a good thing to run quite another to run it The fact is to look at the work a particular unit performs requires an accurate method of collecting and storing relevant data on all the work that the unit does and in such a manner that it can be analysed Conventional notes are not designed for this function as they are really only relevant to a particular patient

Computers clearly offer a method of storing

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data in a form which can be analysed and they represent the way forward. The problem of computer systems is that they are only as good and as accurate as the data that is held by them and thus success depends on the manner in which data is collected and entered into the computer.

This paper deals with the problems encountered by the author and which had to be overcome before a computer based audit system could be introduced into the Department of Surgery, RN Hospital Plymouth. It concentrates on the design of the whole system rather than the audit itself which will be the subject of a further publication.

METHOD

The approach favoured by the surgical disciplines to clinical audit is that of Audit of Outcome. Audit of outcome requires an accurate comprehensive and honest appraisal of the work carried out and the results of that work. Though most of the systems available fall short of the ideal there is a common agreement that by concentrating initially on the admission and discharge data a useful database can be built up. The rationale behind this comes from the fact that the majority of surgical cases have a defined end point and a defined treatment during their admission. By collecting data in a suitable manner and entering this data into a database the production of subsequent documentation can be facilitated. Good design can lead to efficiencies which improve administration and encourage individuals to use the computer system which produces discharge documents, audit data, operating lists etc. The author was involved with the writing and the introduction of the program Dunnfile recently renamed The Cambridge Audit System at Addenbrookes Hospital.[1] This programe was initially developed as an exercise to demonstrate that a computer based audit system could be designed to replace and be more efficient than the conventional administration of admissions to a general surgical firm and at the same time produce the data for running a clinical audit.

The main advantages that the Cambridge Audit System had demonstrated were reduction of secretarial and junior staff time in the production of discharge documents, improved communication with GPs and the collection of data for audit free of extra work. Simple transference of this software was not possible owing to the differences between the administrative data needed for servicemen when compared with civilian patients. The principles and the clinical details needed no modification and the rewriting was limited to that demanded by Service documentation.

Initially no hardware was available and a polite and slightly quizzical response from colleagues met attempts to find out how to obtain the necessary funds to purchase such equipment. It seemed that the real answer was that I should have rejoined the RN two years previously in order to anticipate the need for this equipment now! Fortunately I was asked to present my previous experience with computerised audit to the Plymouth Health Authority and the loan of a computer an IBM PS2 was forthcoming as part of an assessment conducted by the Authority. An unused dot matrix printer was found in the pathology laboratory and with the purchase of one cable through the Research fund the initial hardware was obtained!

Once the system was introduced and running and was demonstrably advantageous suitable equipment in the form of an Olivetti 286 machine with a 70 Mbyte Hard disk and a Laser printer was purchased with Ministry of Defence funds.

THE SYSTEM

Important as it may be the hardware is the last matter to require a decision of far greater importance was the choice of software. The Cambridge Audit System had the advantage that it would cost no money as it was to be modified in house. More importantly choosing this software would take advantage of previous experience of introducing and running this system also much of the hard work was already done and it is always wise to choose software that has been tested and is up and running. The clinical data to be collected was really no different to that collected in any other hospital.

Previous experience had also shown it is very important that when a computer based system is introduced extra work for those individuals who have to use it is avoided. In fact it is essential to make the new system more efficient than the method it replaces for all those who come into contact with it. If anyone finds that they have more work to do they will soon complain, blame computers in general and point out that the old way was vastly superior. If the system is not up and running within a few days the computer will gather dust in the corner!

Careful analysis of the handling of hospital paperwork and discharges was necessary and with this came the definition of what was needed from the new system

Definition of Data Required

The personal details needed for civilian patients were the same in a civilian hospital as they were in a service hospital but there were differences in the data needed for service patients, particularly if the production of service documents was to be included. Those fields required specifically for service documentation are shown in Table 1. In effect the fields of data that have to be collected were in the main defined by the F Med 14

Table 1

Service/Civilian	Regt/Corps
Service Number	Branch/Trade
Ship Unit	Time in Service
Type of enlistment	Medical Category
Recommended sick leave	Enemy action Y/N
Date of MOD Form 298	Activity at time

Data Collection

The hospital already had a system of collecting data on a proforma. Service patients had an F Med 10 raised and there was an equivalent form for civilians. Clearly if these two forms were replaced by a single form for all patients which also included the clinical information then no extra work would be required for the collection of data. Several versions of this admission proforma were produced and tried until a final version which suited the ward staff, the doctors, the secretaries and the Patient Services Centre was produced on two sides of A4 paper (Figs. 1 and 2).

This approach meant that up to this point there was no real change in the way people worked, and no increase in work for them.

Data Transfer

The 'Cambridge Audit System' is designed around the production of discharge documents automatically using the data collected on a proforma. In Addenbrookes a secretary was moved from the typing pool to enter this data and produce the discharge summaries previously typed in the typing pool. The effect of introducing the system and changing the venue of the secretary reduced the secretarial time overall by about 40% as the load on the typing pool was reduced by more than that accounted for by the loss of one member from the typing pool.

This potential saving justified moving one typist from the typing pool to RN Hospital Plymouth to the Department of Surgery where she now works nine sessions per week producing all the discharge documentation for the department.

The data is transferred by the typist from the proformas already completed by the Medical Staff. The computer system thus holds the personal and clinical data on all the patients treated as in-patients by the department. The discharge documents are then produced automatically using this data to complete a standard document constructed on the wordprocessing program. Complex cases have dictated text added to a standard document only part constructed with patient and admission details; these cases are still more efficiently documented than they are with the normal production of discharge summaries.

This aspect of the system required a change in the way one member of the typing pool worked. In making this change we reduced the load on the typing pool by reducing the work load going through the pool by more than the equivalent of the loss of one typist from the pool. Prior to the introduction of the system the delay in producing discharge documents was in the order of four months; the majority of discharge documents are now produced within two weeks. The backlog of other work in the typing pool has also reduced.

Production of Documents

The civilian patients were easily dealt with using a standard letter created with the word processing program; this technique defines various places on the document which are completed from the data held in the relevant part of the database. The production of automatic summaries for civilian patients was started in February 1989 on a trial basis and was adopted by the department from April of that year for all patients. At that time a simple dot matrix printer was all that was available.

Service documentation was more of a problem because of the need to have one copy for Medical Statistics that could be photographed for Microfiche storage. Discussion with the Head of Medical Statistics suggested that a Laser printer would provide the quality of

Medical in Confidence

GENERAL SURGICAL IN-PATIENT CASE SHEET

Hospital №	Service C v l on Retired	RECORD HAS BN COMPUTER ___/___/___
1 Full Service No	2 Rank Rating	3 Regt/Corps/RAN Command
		5 Ship/Unit & Address of C y t on
4 Surname		
6 In names		7 Married / Single / Widowed — 8 Branch/Trade
Male / Female — Religion _____	9 Date of Birth	10 Total full-time service y m mths — Type of Enlistment
GP Surname _____ mnts ___ — Surgery _____ — Address _____ — Tel № _____		Next of Kin _____ — Relationship _____ — Address _____ — Tel № _____
15 Ward in which admitted (first or RE-entry)		12 Length of Service in theatre at date of admission: yrs mths

13 Name of Medical Unit in which Treated — Ward	Date of admission/ transfer IN	Date of discharge/ transfer OUT	No of days	Hospital Serial No
Direct Admission in				
Arrived as a transfer in				
Arrived as a transfer int				

INJURY AND CHILDREN CASES ONLY: (Copy of MOD Form 295 to be attached if available)

21 Enemy action or non-enemy action	22 Date of Incl certificate MOD form 295	23 Nature of weapon or cause of injury

24 Activity at time of injury

Off/Pt duty

Pension № Navy/D A	Dockyard №
National Insurance №	Nursing Pension
Cash £ _____ Valuable _____	Receipt on Patient

Figure 1

Admission Type Emergency/Elective/Readmission/Transfer Consultant _____

Tu

Admitted with _____

_____

Investigations _____

Diagnoses Organ or Site Condition

M / t / Mil 1 m _____ t c _____

M / t / Mil 2 m _____ 2 c _____

M / t / Mil 3 m _____ 3 m _____

Diagnosis Text _____

Other illness _____

Operation Date __/__/__ Operation N° 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 0

Surgeon _____ Urgency Routine / Urgent Emergency

Assistant 1 _____ Supervised Yes / No

Assistant 2 _____

Anaesthetist _____ Anaesthesia Gen / Epidural / Spinal / M

Main Procedure _____ M / t / M t

2nd procedure _____ M / t / M t

3rd procedure _____ M / t / M t

Procedure Text _____

Grade Maj /Min /Int /Min /CNC /CNB /CNA /M

Operation details _____

Blood Loss ____ mls Theatre time ____ mins Histology Specimen Yes / No

Follow up arrangement _____

_____

Complication 1 _____ Grade 1 Death / Major / Minor

Complication 2 _____ Grade 2 Death / Major / Minor

Complication 3 _____ Grade 3 Death / Major / Minor

Complication Text _____

Mode of discharge Home / Transfer / Duty / Dead Intercurrent Illness Yes / No

Discharge Rx _____

General Comments _____

Other Comments _____

Discharge Cat P2 / P3 / P3B / P3B / P7C / P7D / P8 Review on ____ months

Recommend Sick Leave ___ days Follow up Rx ___ weeks

Type of Letter Required Computer / Dictated Signed _____

Figure 11

printing necessary and from subsequent experimentation that 100 gm paper was sufficiently thick to allow both sides of paper to be photographed without the print on the opposite side showing through and in such a form that records could be reproduced.

Purchase of a new computer and laser printer through the Ministry of Defence Catalogue of Information Technology Equipment was forthcoming once funds had been identified. A standard document was designed to appear the same as an F Med 14 with the various boxes on the form to be completed automatically from the database.

It was of interest that by the time these preparations were complete a significant backlog of service documentation had arisen which was in stark contrast to the speed with which civilian documents were being produced. There still remain some problems, as the service documentation is not on A4 size and the Laser printer only works with this size. Consequently each sheet has to be cut by hand. Also the printer does not print on both sides and the paper has to be fed through the machine twice. This can be done as a batch with the first side of each document printed initially and then on a separate run all the second sides are printed. In due course more sophisticated equipment may well become available.

IMPACT ON THE DEPARTMENT

There has been no increase in the overall administrative work load in the hospital or the department in fact there has been a reduction. The proforma used for the collection of data simply replaced the proformas already in use. The junior staff complete one proforma as they did before though we have found it sensible that the operating surgeon completes the operative data and usually the diagnostic data at the time of surgery. Very few patients require any dictation about their admission and this has considerably reduced the burden on the surgical trainees. This fact has been particularly important in the light of the understaffing of the department for most of the period the system has been in use. It means that the juniors have more time for education and research which is often difficult to come by in a busy department.

The accuracy of the data on any computer system has to be checked and the process is usually referred to as Validation. There are good reasons for taking this aspect seriously - analysis of the data may demonstrate obvious errors but it is easy to miss the more subtle inaccuracies which invalidate any conclusion that may be drawn. There is a weekly departmental meeting designed to include all the medical staff during this meeting the previous week's entries onto the computer are checked. This allows more accurate coding of some data with the consultant redefining terms further information is sometimes available on patients and can be added or the record amended and sometimes errors are identified and corrected. This is the one area of the system which does add extra work particularly for the consultants - it is, however an important exercise and allows the consultant and junior staff to discuss the cases and the information that has been recorded on them.

The introduction of the validation meeting allows the data to be checked before the documents are produced and decisions to be made as to whether a more detailed summary is required on those patients inadequately dealt with by the automatically processed document.

BENEFITS OF THE SYSTEM

The main benefits are listed in Table 2.

Secretarial Time

It is clear with the present restriction on resources and manpower that a new system must not increase the administrative burden. Secretarial time is an important resource which needs to be used efficiently. It is not possible to accurately measure the time saved by the introduction of the new system but as the surgical department is the one with the biggest

Table 2

Reduction in overall secretarial time
Reduction in delay for the production of discharge documents
Reduction in amount of time used in dictation of summaries
Data stored on a convenient medium for analysis
Comprehensive audit of work possible
Weekly audit figures produced easily

workload in RN Hospital Plymouth the fact that all its discharge documentation is handled by one typist is a significant saving There has been a considerable reduction in the workload of the typing pool and this has helped overcome their backlog.

Discharge Documentation

It is frequently the case in hospitals that there are significant delays in the production of discharge documents. This is in part due to busy juniors finding time to dictate the summaries especially where there is understaffing and partly because Typing Pools may be overwhelmed by the amount of work staff absences without relief increasing this delay The implications for the GPs are that patients are discharged without the salient information being sent early enough to help in their management after discharge Patients may even appear at the Out patient department for follow up without the benefit of a summary making their subsequent management difficult The aim of the system as run in Plymouth is to produce documentation within a week of discharge and this is the rule rather than exception

Dictation of Summaries

The junior staff normally spend a significant amount of time on the dictation of routine summaries If they are working in a department with a big clinical workload there is no time during the working week for this part of their work The implication is that it needs to be done when they should be off duty or during quiet times when they are on call this eroding the time they should set aside studying for exams or research In the past this has been a major problem for surgical trainees and the reduction in this aspect of their workload is important

Audit Data

As discussed Audit is now part of the pattern of work expected of clinical departments The fact that there is an easily analysable database of the work done by the department is a major advantage The data provided for inspecting teams to assess the pattern of work experienced by the trainees can be produced with ease An operating log of work done by trainee surgeons the degree of supervision the complication rates and the type of surgery performed are all readily available The annual report can be compiled and statistics produced on data that is an accurate reflection of the work done

Weekly Audit Figures

The Surgical department joins each week with the NHS surgeons in Plymouth to present the figures for the work conducted by each firm The individual cases are shown with the diagnosis (or operation) and any complication along with the length of stay The figures for this department are produced by the computer system and this considerably reduces the work needed for this exercise The meeting itself allows criticism and discussion of individual cases and at the same time demonstrates the amount and pattern of work of each firm One of the side effects of this has been to demonstrate to the NHS surgeons the amount and scope of the work done in RN Hospital Plymouth There is now a recognition that the department has a surgical workload equivalent to that of two NHS Consultants and their firm in the city and that it is a highly significant provider of health care in the district

Recently there has been considerable interest in the performance of the hospital and an assessment of its future. There is no doubt that the figures produced by the departments database has been crucial in demonstrating the pattern of work carried out and the implications this has for the Armed Services in the West and South West along with the training of surgeons and anaesthetists

CONCLUSION

There is no doubt that the introduction of computer based systems offers considerable advantages to clinical departments within service hospitals The data that needs to be collected are defined by the service documentation already in use and if these data are collected then service documentation can be produced using laser printers and good quality paper in such a form that can replace the old card copy of the F Med series of documents In the future direct transfer of this information will be possible using magnetic or electronic media thus completely bypassing the need for these copies of the documentation to be on paper

Well designed systems can reduce the secretarial time needed for routine documentation and release time for trainees to concentrate on their education and research

The process of Audit is enhanced and made practical for busy departments This is now an essential part of professional discipline and is best achieved using computer systems

Assessment of performance and budgeting of

work carried out by clinical departments is now more readily available and in such a form that makes it possible for service hospitals to consider the opportunities for contract work presented by the changes taking place in the NHS

ACKNOWLEDGEMENT

Mrs J M West for all secretarial help

REFERENCE

1 Dunn DC Dale RF Combined computer generated discharge documents and surgical audit *Br Med J* 1986 292 816–818

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W(h)ither the Naval Hospitals?

Robert Muddysley

Now I know you mean business you have brought your surgeons Anonymous Russian General observing Surgical Support Team 1 deployed on exercise in support of the Royal Marines in Norway

TAILPIECE (1)

'Sorry Doc the Naval Hospitals (RNHs) are the most expensive part of a tail arm money is tight if we close the hospitals we can have another Sea Harrier or two or three and have some manpower within the ceiling

The medical service is *not* a tail arm we maintain the primary weapon system and (see the heading of this article) are part of the deterrent. If one more slice of salami is taken we will cease to be an effective fighting branch training capability will go with it our war capability (such as still remains) and peace time support of the fleet

'Come on Doc RNHs are no use to us they are full up with civilians and will never see a sailor when you want them to and as for their estimated durations (ESDURs)

Like most popular beliefs there is a grain of truth in such complaints which stem from a misconception of the role of the RNHs Haslar and Stonehouse are primarily training establishments any benefit to the Fleet and indeed to the populations of Plymouth and Gosport are secondary to the war role

War role? come off it Doc

In war most of the medical branch deploys in support of the North Flank operations by the Marines either ashore as one of the Surgical Support Teams (SST) or afloat as the medical element of a Primary Casualty Receiving Ship (PCRS) or Secondary Casualty Receiving Ship (SCRS) These ships would be taken up from trade (STUFT) embarking a medical element appropriate to role The RNR additionally provides medical teams to the channel ferries which would casevac casualties from Europe.

TRAINING DOCTORS

The staff of the Naval Hospitals are performing their war role day and daily for real Not for us the once yearly live firings ones is on job training with live ammunition ! Come the day we have to have surgeons anaesthetists nurses MAs (specifically ODAs or Operating Department Assistants) and little else

OK Doc So why a kiddy doctor at Haslar?

A medical degree is only a very basic qualification No career job is open to a doctor unless postgraduate training has been successfully undertaken and that training is rigidly controlled and overseen (including regular and searching inspections) by the medical Royal Colleges, which are independent [2] They specify what is and what is not acceptable training For example to undertake surgical training a department must undertake surgical treatment of children A children s ward has to be under the charge of a consultant paediatrician Hence the navy has to have a paediatrician to train its surgeons for its war role This and many similar restrictions imposed by the Colleges to ensure proper training dictate the form of the Naval Hospital Service

Simple Doc just train our doctors to do what we need Then they will have to stay because they won t be trained to do a job outside

Reprinted from the April 1990 edition of *The Naval Review*[1] with kind permission of the author (see Note)

This is well known in the trade as 'The Army Solution'. All Army surgeons used to have to be Military Surgeons or Battle surgeons. If someone wanted to be say a plastic surgeon (for which there is an identifiable service need) he had first to do four years general professional training in surgery (which all surgeons do) then a further four years before recognition as a competent military surgeon (13 years from entry to medical school) and then embark on his own chosen specialist training another four years. Many years after the Army stopped insisting that their surgeons were Military surgeons' they still cannot fill all their consultant billets and still cannot recruit enough to replace those it has let alone make up the shortfall.

That's the army Doc!

To recruit, we have to offer something attractive. Actually the Navy is attractive to doctors and we get first class entrants. Why? Because the job is interesting and in the very competitive world that is medicine we offer a good training during the period of the short service commission. It's no good offering six years 'fun and expect them to go outside and do their postgraduate training because six wasted years is a career kiss of death at a civilian appointment interview. The Naval Medical Service relies on its short service commission officers to do the majority of the jobs. They are essential but they want to be trained. On average they do two years in ships/establishments or with the Marines and then occupy training billets mostly in Naval hospitals which have a service commitment re on job training. Who are they trained on? In large part the (willing) populations of Plymouth and Gosport who value the service they are given which in turn isn't bad PR. Is there any other branch which gets its return of service first and then trains on the job?

Super Doc absolutely super. Why train on civilians, why not just on servicemen?

To be a competent surgeon or anaesthetist a surgeon must have had a breadth as well a depth of experience. For example to operate on war wounds of the abdomen (or belly as surgeons tend to call it) needs practice on abdominal surgery. Just about the only thing the young population of the Navy gets wrong with its collective belly is appendicitis: mere learner slopes for battle surgery. Therefore we need civilians with the nastier diseases of old age which are good training.

TRAINING NURSES

The navy trains some of the best nurses in the UK. They are magnificent during Corporate[3] and despite the present pressures (see below) still maintain extremely high standards. However despite major efforts we cannot recruit enough already fully trained to meet our war needs so we have to train as laid down by the UKCC the training body who impose constraints on what we may and may not do to ensure that the nurses are properly trained.

Nice system Doc does it work?

We can and have put a first-rate surgical capability into the field if required. Remember Corporate? Those of us who stayed at home remember being chilled by public opinion polls of the acceptable casualty levels. Gentlemen thank God that the Naval Medical Service came up with the goods as we had another medical Balaclava, Somme or even (viewed from a modern perspective) another Normandy. Corporate would have become politically unacceptable. Think what Panorama would have done during the conflict if they had had a sniff of medical ineptitude or incompetence.

Right Doc why this article what's the problem?

RETENTION

For doctors we have got it about right. The number applying for longer commissions just exceeds the number we need and has done for some years. However because of the increasing pressures on the Home hospitals (see below) not only will the number applying for a full career commission inevitably drop but the number applying to join already shows signs of doing so.

For nurses retention is close to non-existent. They are going in droves. Why? Money. An enrolled nurse (EN(G)) will immediately earn at least £1000 pa more outside (remember it is the same government paying them more to do the same basic job if they do it in the NHS!). Not surprisingly we cannot recruit EN(G)s, the background of the QARNNS. Because the Nursing school that the Naval school is part of is being funded by the government as the lead school for a civilian training initiative called 'Project 2000' we do not train EN(G)s any more. The rights and wrongs of Project 2000

regarded in some quarters as the greatest disaster to ever hit British nursing it is beyond the remit of this article

EFFFCTS OF THE NURSES RETENTION DISASTER

Over the years as the Navy has shrunk the size and number of naval hospitals has redneed RNH Haslar had 550 beds in 1966 450 in 1974 to 305 in 1982 which remains the enrrent anthorised bed number The hospitals have borne almost the entire brunt of the shortfall of nurses and have made major bed closures RNH Stonehouse is snpposed to have 205 beds it has approximately 90 open RNH Haslar has 180 open In part the shortfall of nurses has been made up by agency nurses (often onr own nurses, just ontside on notice back earning much more doing the same job which confirms that it isn t the job that is the problem) The number of agency nurses is snbject to a budget which was overspent for 89 90 by Jnly 89 They may only be employed to fill gapped MA lines[4] and not gapped nurses complement lines

At the present anthorised bed nnmbers the Royal Naval Hospitals are close to losing recognition for training for medical officers and nurses in all specialties (and that inelndes general practice) With the actnal bed nnmbers recognition will be lost at each specialty inspection by the Colleges When that happens recruitment will stop because no doctor will join The war role will be insnpportable and rapidly the medical branch as a whole will be redneed to an occupational health branch who will train ontside hospitals

Come on Doc does a fighting service really need its own peacetime hospitals?

If we as a Service are to be serions abont having a war fighting capability yes The peacetime role as maintainers of the Navy s primary weapon system has barely been tonched on Without RNHs treatment of the injured or ill serviceman becomes the responsibility of the NHS Most service patients (approximately 60%) attending hospitals do so with the after effects of injnries as orthopaedic patients The enrrent waiting list for orthopaedic patients to be seen as an NHS ontpatient in the Portsmouth area is over 15 months The waiting list for operations is over a year Pnt recovery/rehabilitation on top of that

"OK Doc we ll bny a block BUPA membership

Private practice is undertaken by NHS consultants additional to their NHS workload The enrrent wait to be seen as a private orthopaedic patient in the sonth of England exceeds three months Add 60 000 patients to the private pool and waiting times will increase Suddenly the much maligned waiting times in home hospitals which in the most heavily loaded specialty is approximately two months looks a bit better[5]

TAILPIECE (2)

While a lot of problems are the result of a coincidence of the MA recruiting block and the EN(G) retention problem there is a lesson for the Service as a whole We are now in a market oriented society we have to realise that people now do not join the service expecting a lifetime s career If they see a better opportunity they will take it To meet this challenge we have got to be able to react both in terms of pay and conditions For pay this means the end of all of one company We are going to have to pay the going market rate for the job The other side of the coin is that this will be accepted far more readily than it might have been a few years ago

A proper responsibility budget system would go a long way to allowing conditions of service to be varied in the case of RNHs a creche would make a lot of difference in our search for agency staff bnt trying to find it

For the hospitals the Health Service reforms (if implemented) will mean that the Naval hospitals will actually bill the NHS for services rendered which at the moment they get for nothing.[6] In the short term if the Royal Naval Hospitals are to snrvive our nurses have to be paid so that they are not effectively subsidising the service (the government pays them more ontside) Above all the Service as a whole must recognise that its medical service is an essential part of the whole and if it is to remain it has no fat left it has reached and possibly passed the minimum to remain viable

Note In a previous incarnation Robert Muddysley was Barber Surgeon of Hallous Lombard Street London In 1548 he was appointed Surgeon to Edward Lord Clinton later Earl of Lincoln and Lord High Admiral (at that time senior officers took their own surgeons to sea in preference to using the ships surgeons) On appointment he appointed administrators to his estate as he passeth presently with the Lords

Clynton in the kyngs maiesties affayres maryne to Warre Fhare

NOTES

1. Which is why medical branch officers and ratings find casualty play devised by the non medics to be charitable a little superficial
2. The Royal College of Surgeons of England has a charter granted by Henry VIII When the Rt Hon H Wilson tried to bring the colleges into his brave new Britain the charter proved unbreakable
3. QARNNS were the only Service females in the exclusion zone during hostilities
4. MV recruiting was stopped in 1984 as a panic move to deal with a then over bearing The resulting under bearing is likely to be with us for a long time
5. Some resentment is expressed that exiles are seen ahead of servicemen no unless urgent (ie with cancer etc) they wait far longer Dependants are treated quickly would you wish a different particularly if you are a divisional officer having to have a man at home to look after the kids because his wife is waiting for hospital treatment
6. Which does nothing to stop them bleating like

block of strangled lambs if the service given doesn t measure up to what they want instead of to Naval needs (for example Haslar has a five day paediatric service and no weekend emergency paediatric cover).

* Editorial Footnote

The following are eligible for membership of *The Naval Review* officers under training and commissioned officers active or retired of the Armed Forces of the Crown and the Commonwealth and their Reserves also members of the Royal Corps of Naval Constructors and the Royal Supply and Transport Service and officers of the RNXS and RFA Service The Editor can admit other persons in touch with and interested in the Royal Navy Applications for membership should be made in writing to

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The Royal Naval Medical Stores for Service Afloat: a prospective quantitative study

E P Dewar, K A W Mitchell, D A Hett and R B Taylor

Abstract

The contents of the scale of Medical Stores for Service Afloat must provide adequate quantities of drugs to allow proper patient care in a variety of situations often remote from specialist support. The overall make up of the scale is difficult to envisage outside the context for which it was conceived. This study was designed to assess the accuracy of the make up of the scale in three RN ships over a six month period during a detached deployment. During this time the usage of all consumable items was specifically recorded and the outcome subjected to a forces analysis in relation to the present scale. The results of the study indicate that in the case of both HMS *Ark Royal* (AR) and the two smaller ships HMS *Edinburgh* and HMS *Sirius* (ES) the quantities of drugs in the majority of cases are in excess of requirements. Of the 290 (AR) and 266 (ES) individual drugs 68% and 40% respectively could safely be reduced by varying amounts whereas only 7·6% and 4·9% respectively needed to be increased. Furthermore when these changes are costed the savings that result are £7806 for the AR scale and £1532 for the ES scale. Extrapolation of these figures across the surface fleet produces an overall saving on the costs of drugs of over £87 000.

INTRODUCTION

In April 1988 the new scale of Royal Naval Medical Stores for Service Afloat was implemented in the Fleet [1]. It has long been recognised that there are certain inherent difficulties in preparing such a large document. Advice is sought from appropriate specialist areas regarding the content in terms of providing adequate medical supplies to cover the spectrum of illness and trauma that may be encountered. The aim being to produce a comprehensive package of stores for all envisaged eventualities and to fulfill certain requirements [2].

The major difficulty has always been to predict accurately the quantities of drugs and other stores needed for ships of varying sizes taking into account the capability to practise good patient care, the logistics of storage and finally the costs involved. To date there has been little data on which to base the calculations.

In order to obtain such data we performed a prospective study to evaluate the new scale in the three RN ships in the six months deployment OUTBACK 88. The total usage of all consumable items was recorded to elucidate the accuracy of the scale and to provide a basis upon which if necessary recommendations for change could be made.

This paper reports the findings with regard to the pharmaceutical items of the scale. Each drug being analysed for percentage usage and this in conjunction with clinical considerations used as the basis for any recommended quantitative alterations. The changes are costed and the results extrapolated across the surface fleet.

METHODS

A computerised data collection form (DCF) was designed on which were recorded the scale of each drug, the amount used during the six months from 13 June to 15 December 1988 and any additional amounts ordered on the

At the time of writing, the authors were all appointed/drafted to HMS *Ark Royal*. Surgeon Commander Dewar is now Head of Surgery, RNH Plymouth. Surgeon Lieutenant Commander Hett is appointed to RNH Haslar.

deployment It had been anticipated during the planning for OUTBACK 88 that certain items might be used more than others and these high hit items were ordered in excess of scale prior to sailing. This was taken into account in the subsequent analysis All drugs were in date on departure with expiry dates in excess of the duration of the deployment.

The DCFs were issued to the three ships HMS *Ark Royal* HMS *Edinburgh* and HMS *Sirius* all of which carried medical officers with instruction on their correct and accurate completion At the end of the deployment the forms were collected the results collated and the data for the pharmaceutical items analysed

The usage of each drug was expressed as a percentage of the scale for that drug in each of the three ships The results for *Edinburgh* and *Sirius* were then taken as the mean of the two as these ships have the same scale Based upon this percent usage and clinical experience gained during the deployment the quantity of each drug was assessed as being correct or needing to be increased or decreased Where a change was indicated this was evaluated quantitively The cost of the whole scale of drugs was calculated and where a change was recommended this was also costed and the sum of the changes calculated

The costs were based upon those listed in The Monthly Index of Medical Specialties' (MIMS) and the British National Formulary (BNF) these being the best available sources the constraints of which are discussed

RESULTS

The scale of stores is mainly based upon the numbers of personnel for which each ship is complemented The *Ark Royal* (AR) column 6 of the Medical Equipment Cataloguing and Codification Agency (MECCA) Form 1 therefore being larger than for *Edinburgh* and *Sirius* (ES) column 9

All the drugs in the scale were included in the study comprising 290 for *Ark Royal* and 266 each for *Edinburgh* and *Sirius* The anaesthetic gases were excluded because of difficulties in accurately quantifying their usage

Table 1 shows examples of the rates of usage over the six-month period of a variety of drugs and demonstrates the wide range of results obtained For clarity further results are presented with the drugs broadly classified into clinical treatment categories

Of the 290 drugs in the AR scale one-quarter were assessed as being of the correct quality two thirds as being in excess and therefore able to be decreased and the remainder 7 6% in need of being increased (*Table 2*) In the ES scale of 266 drugs no change was indicated in just over half a decrease in 40% and an increase in only 5%

The changes assessed as being required in the 22 clinical categories of drugs in terms of the number of items needed to be increased decreased or unaltered are shown at *Table 3* It can be seen that in every category in the AR scale reductions are indicated and in ten categories an increase However in all categories except anaesthetic the overall result is a financial saving In the ES scale two categories remain unchanged in 19 a decrease is indicated and in only seven an increase In all but three categories the overall result is again a financial saving The total saving for the AR scale amounts to £10 408 40 and for the ES scale

Table 1 Examples of percent usage of individual drugs

	AR		ES	
Drug	Scale	%Usage	Scale	%Usage
Paracetamol	5000	112	1000	75
Amoxycillin	2500	52	500	70
Betnesol	30	0	6	6
Anusol HC snpps	1440	0	288	0
Codeine Phos	2500	16	500	0Edi 240Sir

1 Percentages above 100 indicate items that were reordered during deployment

2 *Sirius* very high usage of Codeine Phosphate was the result of an outbreak of diarrhoea following a trip to the Pyramids

Table 2 Changes in the quantity of drugs as a percentage of the total number in the scale

		Percent change		
Scale	Number	No change	Increase	Decrease
AR	299	24 5	7 6	67 9
ES	266	54 5	4 9	40 6

Table 3 Changes and financial savings in clinical categories

	AR				ES			
Category	NoC	Inc	Dec	Save (£)	NoC	Inc	Dec	Save (£)
Anaesthetic	5	2	3	−23 32	3	0	0	0 00
Analgesic	8	2	14	1460 88	12	2	9	243 13
Antibiotic	6	2	21	2290 58	10	1	16	296 20
Anticoagulant	0	0	4	72 40	3	0	1	0 72
Antihistamine	0	0	4	46 74	2	0	2	11 32
Antimalarial	2	0	3	180 64	3	0	2	23 10
Antitussive	2	1	1	145 00	3	1	0	−2 50
Bronchodilat	4	0	4	434 85	5	0	2	65 01
Cardiac/Renal	3	0	18	332 32	14	0	5	40 28
Dermatology	10	5	37	1102 90	22	4	23	147 60
Diuretic	0	0	4	72 76	4	0	0	0 00
ENT	0	1	8	543 95	3	0	8	133 79
Gastrointest	4	5	13	246 51	7	3	9	61 14
IVI	9	1	3	221 50	10	0	3	61 80
Local Anaesth	2	1	6	99 35	3	0	5	49 18
Miscellaneous	5	2	12	352 145	10	1	7	217 68
Ophthalmic	4	0	8	126 64	6	0	6	19 30
Rectal	0	0	6	408 15	3	1	2	66 95
Sedative	3	0	13	152 43	11	0	4	6 19
Steroid	3	0	4	472 09	3	0	3	282 20
Vaccines	1	0	4	1452 20	2	0	2	303 90
Vitamins	0	0	7	180 48	6	0	1	10 00
Total	71	22	197	£10 408 40	145	13	108	£2 042 97

Miscellaneous = Antidiabetic Oral Gout Hair and single miscellaneous drugs

£2042 97 each scale providing supplies for a nine-month period.

There were certain confounding factors that had to be considered in the calculations Firstly the deployment was for six months and not nine months However we believe that a six month deployment away equates to a nine month period in home waters when leave periods and the disembarkation of the Carrier Air Group when alongside reduce the numbers of personnel on board Therefore no correction was indicated and none applied Secondly the prices in MIMS and BNF on which the costings were based are probably higher than those paid to large Tri-Service contracts In subsequent calculations we have therefore applied a correcting factor of 25% to take this into account bearing in mind that some additional costs are

Table 4 Value of savings as a percentage of the full scale cost at estimated contract prices

Scale	Full Scale (£)	Saving (£)	Percent Saving
AR	24 156 65	7 806 30	32 31
ES	6008 01	1 532 23	25 50

NB Full scale costs before correcting for contract prices are AR=£32 162 20 ES=£8010 68

Table 5 Value of savings in commissioned surface ships above the size of minor vessels

Class/Type of Ship	Number in Commission	Savings per Ship (£)	Savings per Class (£)
Invincible	2	7 806 30	15 612 60
LPD	1	4 678 93	4 678 93
82	1	2 797 25	2 797 25
22 42 Leander	34	1 532 23	52 095 82
21 23 Endurance Survey Challenger	10	1 170 94	11 709 40
Total			87 094 00

passed on to individual service pharmacies by the Tri Service centre to cover administrative expenses Applying this correction the saving for the AR scale is £7806 30 and for the ES scale £1532 23 32% and 25% of their respective corrected total costs (*Table 4*)

EXTRAPOLATION OF RESULTS

The ratio of savings between the AR scale and the ES scale is 5 09 and this correlates well with the ratio of complement numbers (4 8) for which the scales were designed Using this result we are able to use the quotient of complement numbers of varying sized ships compared with the complement for which the larger AR scale was intended to calculate the anticipated savings in other classes of ship

The results at *Table 5* demonstrate the projected savings for each class of ship in the surface fleet above the size of minor vessels initially for individual ships and then for all ships of similar class Allowance has been made for the known or anticipated number of ships of each class in commission at any one time The estimated total savings across the surface fleet is £87 094 00 on the initial corrected ordering costs for a full scale

DISCUSSION

This study has attempted to furnish some definitive data regarding the accuracy of the medical stores for service afloat which heretofore have not been available It is based upon the experience in three ships one CVSG and the mean of two others having the same scale as each other Ideally for statistical purposes more seagoing units would be recruited but the magnitude of such a study probably precludes its successful accomplishment

In a single deployment one cannot expect to encounter the complete variety of illnesses and trauma that may occur in different circumstances but the OUTBACK deployment represented we believe a typical example of the spectrum of the problems that are likely to be met However because it was a unique experience we have not attempted to validate or repudiate the prerogative of individual drugs to be on the scale These drugs have been recommended as having a place by the advisers in particular specialities and the fact that we did not need to use a drug in our circumstances does not mean that there is not a requirement for its presence in other situations We have therefore deliberately not removed any specia

list drug completely from the scale though we may have recommended a significant quantitative adjustment

The calculations are based upon our data of usage of drugs but certain surmises have had to be made These confounding factors mentioned previously have been taken into account where appropriate their inclusion justified and reservations registered where applicable Allowance has also been made for items such as IVIs which would be needed in mass casualty situations The figures of cost savings must be interpreted bearing these points in mind and are not claimed to be definitive but in view of the amounts involved the percentage margin of error is likely to be small and the trend in savings is very obvious and not insignificant

Furthermore, if the quantities of individual drugs are reduced in the scale then not only is a saving effected on the costs of the initial ordering of the whole scale for a ship but also upon reordering for used items or replacing those that have gone out of date. The saving is thus ongoing after the commissioning of a ship but to a lesser extent

Since the outset of the trial a few amendments have already been made to the scale but as they were not in effect during the period of the study they have not been included In any case they have minimal effect on the magnitude of savings

Decisions on some of the recommended changes were easily made for instance to reduce the number of 5 ml ampoules of water for injection with 16% usage in the AR scale from 1500 to 500 resulting in a saving of £200 Similarly 1440 Anusol HC suppositories with a zero usage to 60 with a resultant saving of £286 35[p] Others were not so easy and where any doubt existed then no change was recommended

We believe that our proposals represent a more realistic indication of the quantities of drugs required than are at present in the scale They would still adequately meet the therapeutic requirements of each type of drug should the clinical situation arise where it needs to be used

The absolute quantities would need to be judged in practice but the trend towards being able to reduce the overall size of the scale ease storage problems and significantly cut capital costs is beyond question Bearing in mind that we have made generous allowance for purchases through contracts have not included the savings that would accrue from the reduction in man hours spent in packaging administration accounting and storage and the fact that as the flagship we carried a complement greater than that allowed for in the scale as well as attracting extra patients by referral from the RFAs in company the calculated savings must be an underestimate and in no way an exaggeration

The proposed reductions in the scale and consequent savings can we believe be effected without detriment to patient care and without constraint to prescribing medical practitioners.

ACKNOWLEDGEMENT

The authors gratefully acknowledge the valuable contributions of the Medical Officers of HMS *Edinburgh* and HMS *Sirius* Surgeon Lieutenant P Hughes and Surgeon Lieutenant D Murry

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NOTE

This study was undertaken at the request of Fleet Medical Officer and costs etc are those existing in 1988

1990
75th ANNIVERSARY

The first publication of the Journal of the Royal Naval Medical Service was in January 1915. Volume I comprising the four issues of that year. The Editorial Committee are to mark this milestone by offering a commemorative prize

THE JOURNAL OF THE ROYAL NAVAL MEDICAL SERVICE 75th ANNIVERSARY PRIZE

75 Guineas to be awarded to the author of the best paper submitted by a member of the Royal Naval Medical Services during 1990 who remains under training or not graded consultant or of equivalent status

The entries will be assessed by the Editorial Committee whose decision will be final

ABSTRACTS

The Editor envisions that many members of the Royal Naval Medical Service who contribute to popular scientific medical and nursing publications would also appreciate the opportunity to draw their work to the attention of uniformed colleagues. We will be pleased to publish appropriate abstracts of these forwarded for inclusion in the Journal of the Royal Naval Medical Service.

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Bilateral synchronous mixed germ cell tumour of the testis

T J W Spalding

CASE REPORT

A previously healthy 41 year-old male presented with a painless swelling of the right scrotum of 18 months duration which had recently increased in size. A large irregular hard mass replaced the right testis but a localised mass was also palpable in the upper pole of the left testis (*Fig. 1*). Bilateral inguinal orchidectomy was performed.

Histology revealed both tumours to be mixed. The right was predominantly extensively necrotic malignant teratoma undifferentiated (MTU) with areas of yolk sac differentiation, intratesticular vascular invasion and a

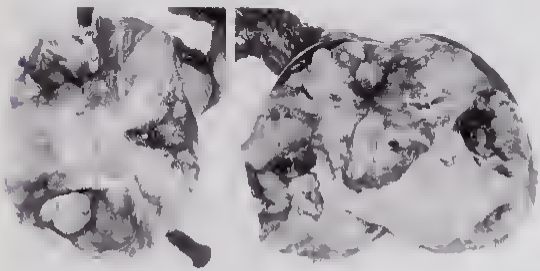


Fig. 1 Close up view of the surfaces of both testes. The right testis (on the right side of the photograph) shows extensive replacement by a glistening corrugated locally necrotic neoplasm with some cystic degeneration. The left testis (on the left side of the photograph) is also largely replaced by a nodular neoplasm with a predominantly homogeneous appearance.

Surgeon Lieutenant Commander Spalding is Orthopaedic Registrar currently appointed to the Helicopter Emergency Medical Services (HEMS) at the Royal London Hospital, Whitechapel.



Fig 2 Low power histological view of left-side tumour showing mostly seminoma with a glandular focus of MTU in the top left hand corner (H & E×40)

small discrete focus of classical seminoma with a lymphocyte infiltrate. Müllerian duct remnants were found in the cord. The left was predominantly seminoma with lymphocytic infiltration but with no additional small foci of MTU (*Fig 2*).

Pre-operative alpha fetoprotein (AFP) was 26 kIU/l (<10) and beta-human chorionic gonadotrophin (BHCG) 2 IU/l (<4). Cord levels were right 705 and 2 and left 316 and 76 respectively.

He was staged IIa disease and treated with combination chemotherapy. Twenty four months later he remains disease-free on androgen replacement.

COMMENT

The incidence of bilateral germ cell tumours is rising but they represent only 5% of testicular neoplasms [2]. Bilateral synchronous tumours are rare. Miles *et al* reported two cases and reviewed the histological features of 32 confirmed cases previously described [3]. They found that 89% had identical tumours on both sides and that 56% were bilateral seminomata. Thompson *et al* reported a case of bilateral synchronous mixed tumours which were morphologically identical [1].

This paper reports a case of bilateral synchronous mixed tumours with a different predominance in cell type.

The importance of careful examination of the contralateral testis at presentation is emphasised.

ACKNOWLEDGEMENTS

I wish to thank Surgeon Captain J. L. Jenkins Royal Navy for permission to report this case and Dr B. Conroy for his histological opinion.

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First World War Naval Medical Officers' Journals

P S Ellis

During the year in which the Journal of the Royal Naval Medical Service celebrates its 75th Anniversary Haslar library has received a large number of Medical Officers Journals written during the First World War These journals had been stored in the Public Record Office and were due to be destroyed at the end of the century

The casual browser will not be disappointed journals can be found for the largest battleships of the Grand Fleet and the smallest coastal defence forces Other journals can be found from shore bases submarine depot ships and early Royal Naval Air Service aerodromes The majority of the journals are in the 1504 pattern inscribed M177 M180 or M181 according to the size of the ship's company The journals are fair copies mostly handwritten by the Senior Medical Officer at the end of each year They are completed in a standard format which was taught during the new entry course at Haslar The first section records in detail clinical cases of particular interest and all fatalities Table I then lists the ship's itinerary often omitted during wartime with Table II providing details of Hurt Certificates issued Table III records the incidence of each disease and the ensuing number of days of sickness A section of general remarks then follows which often includes a description of newer ships, employment of the ship general health of the ship's company and details of any epidemics and their management Finally an alphabetical sick list appears at the end A glance inside the front cover reveals remarks made by the Medical Director General's staff written in blue crayon frequently admonishing medical officers for not forwarding the new typhoid vaccination returns Medical officers are reminded that

The intention of this Journal is to train the Surgeon in the methodical arrangement and clear statement of facts to encourage him in scientific observations and research and to enable the Director-General to form an opinion as to his professional abilities zeal and attention to his duties and it must be borne in mind that advancement in the Service will greatly depend upon the character of the Journal

Some extracts from the 1915 journals now follow with brief introductions

HMS *LION* THE BATTLE OF DOGGER BANK

Lion was the flagship of Beatty's Battle Cruiser Squadron Known as one of Fisher's New Testament ships she was fast powerful and had a main armament of eight 13 5 inch guns Displacing 26 350 tons her complement numbered just over 1200 men including three medical officers On 23 January 1915 Admiralty Intelligence reported that German battle cruisers under Admiral von Hipper were leaving their River Jade base to reconnoitre the Dogger Bank Beatty was sent to cut off the enemy in company with Goodenough's First Light Cruiser Squadron and Tyrwhitt's Harwich force of light cruisers and destroyers *Aurora* from the latter force made first contact at 0715 on 23 January causing the enemy to make for home The British battle cruisers gave

Surgeon Lieutenant Ellis has recently left the Royal Navy and is presently on the Emergency List

chase, with *Lion* opening fire just before 0900 at a range of over eight miles Shortly after 1000 *Lion* began to suffer from concentrated enemy gunfire receiving hits from 15 heavy shells which knocked out all lighting and electrical power shut down the port engine and started fires in "A turret magazine which was flooded minutes before the ship threatened to blow up *Lion* hauled out of the line with an 11 degree list later being towed to port As a result of a submarine scare compounded by signalling errors the majority of von Hipper s ships escaped leaving the slower *Blucher* to her fate Fleet Surgeon Maclean writes

"In the forward station were Staff Surgeon Kingston a first aid party and a stretcher party with Neil Robertson stretchers (the only stretchers used in the action) Walking cases only (as was anticipated) were able to come to this station and the stretcher parties who went out from here took their wounded to the after station. I was in the lower conning tower where I could receive messages and pass them by telephone and messenger to both stations and stretcher parties I was also able to safely reach the mess deck (with a first aid bag) when men were wounded there, and I was within reach of the conning tower and fore transmitting station had I been wanted there In the after station there was a first aid party and also a stretcher party Staff Surgeon Cox and the Sick Berth Staff were in the switch room for safety with orders to go up to the after station as soon as the wounded arrived there First aid bags were in all turrets and batteries also in the conning tower and in isolated compartments below Smoke pads and water to damp them were found in all parts of the ship and were found very useful and efficient when smoke and fumes became troublesome between decks I do not think I could have remained on the mess deck just after one shell had exploded if it had not been for my smoke pad Contrary to expectation nearly all the wounded reached the dressing station during the action but it should be mentioned that only two men were wounded in turrets and of these one remained till after action and one (a walking case) came down the hoist and reached the foremost station before firing ceased. The remainder of the wounded were injured between decks and all stretcher cases were taken to the after station—behind armour all the way No one was injured in engine rooms or stokeholds but it had been arranged to remove any such to the after station by the lifts

"All that was attempted during action at the dressing stations was the application of first aid dressings the stopping of haemorrhage and the administration of morphia by Wilding's syringes Only one case required a tourniquet First aid was rendered in all cases satisfactorily Towards the end of the action the water on the mess deck threatened to drown the wounded who had been disposed of on bedding outside the after station and they had to be removed to the issuing room further aft

"As soon as the action was over and the number and condition of the wounded in the stations was ascertained I went round the ship to search for further casualties and to select a place for treatment The Sick Bay was found to be undamaged though some water had found its way in It was also large enough for the small numbers to be treated which was fortunate as all the other previously selected places (Admiral s and Captain s cabins and the Wardroom Mess etc) were so badly damaged by shell and water as to be unfit for the purpose at the time The cases were accordingly taken to the Sick Bay and taken in hand thoroughly one at a time particular attention being paid to cleansing of wounds and surrounding skin Iodine was freely used as also was Hyd Perchlor and carbolic solutions and in one case pure carbolic It may be mentioned here that the latter part of the first aid treatment in the station and the first part of the methodical treatment in the Sick Bay were much handicapped by want of light—all electric and oil lamps having gone out before the close of the action the failure of the oil lamps being due to concussion At first we had to use candles then magazine hand lamps (electric) were obtained and later a wandering lead was brought to the Sick Bay The Sick Bay supply of water was cut off by damage to pipes and fresh water was hard to obtain owing to damage to tanks and pipes Fortunately a supply had previously been got ready in mess kettles in the stations and in the Sick Bay etc Hot water could only be obtained from kettles in the galley or on the Sick Bay fire Anaesthetics were necessary in four cases only a) a case of multiple fracture of the femur with delirium b) a case of depressed fracture of skull which was successfully elevated c) a case of wound of the wrist

where the radial artery had to be tied d) a case of very large popliteal wound and fractures of the leg Antisepsis vaccine was given in two cases both cases did well and had no rise in temperature but whether this was due to the vaccine or the antiseptics is doubtful All the cases had been dealt with put to bed and fed by the afternoon It was only necessary to repeat the morphia injections in two cases All the wounded did well on board and were discharged to Queensferry Hospital on 26 January in the afternoon None of these cases were septic at that time and I am told no suppuration appeared for some time afterwards A case of splinter wound of shoulder subsequently became septic (but not severely) and was sent to hospital on 2 February Of the 21 casualties none were killed six were severely wounded three less severely wounded and 12 slightly wounded Eleven of these cases had wounds caused by fragments of shells flying bolts etc and ten were merely injured by being thrown down by concussion Three of the cases had burns caused by the flash of explosions but none of the burns were extensive or severe Only one case seemed to suffer from fumes—and he developed a slight pneumonia subsequently

WAR IN THE DARDANELLES

In January 1915 the British War Council received a request from Russia, asking for action in Turkey to reduce the pressure on their forces in the Caucasus Churchill then First Lord of the Admiralty was in favour of a Navy only assault to breach the Dardanelles, enter the Sea of Marmara and threaten Constantinople A strong force including French and British battleships, began operations to bombard the outer forts of the straits on 19 February Demolition parties were also landed on the European and Asiatic shores Once inside the narrow straits operations became much more difficult as the ships faced further forts mobile howitzers and minefields On 18 March Admiral de Robeck launched his most powerful ships into the Narrows in a final effort to break through Tragedy ensued with the mining of the *Inflexible Irresistible Ocean* and the French battleship *Bouvet* which sank with the loss of almost all of her 640 men The Russians meanwhile had defeated the Turks convincingly in Armenia but the British pressed on with operations in the Dardanelles deciding that the Army would have to land The landings at Anzac and Cape Helles did not take place until 25 April by which time the Turks aided by German advisers had greatly reinforced the peninsula The first day of troop landings was witnessed by Fleet Surgeon Menary in HMS *Lord Nelson*

Sunday April 25th I was called at 3 30 am to find the ship under way had breakfast and went on deck just after 4 am It was still dark but bright starlight no lights were shown ships and battleships transports and small craft loomed in every direction Not a sound audible—even the most prosaic mind must have been stirred

Action was piped at 4 30 am and about 4 40 we were in our position which I afterwards learnt was in Morto Bay our special duty was to cover the landings of 750 S Wales Borderers who were to occupy a high bluff known as De Tott s Battery Punctually at 5 am the bombardment commenced other ships were lying off Sedd El Bahr Cape Helles and off the peninsula on the Gulf of Xeros side and all began at the same moment. This continued till about 6 30 am without any reply from the enemy Just before 7 I went on deck for a few moments flames clouds of smoke and dust over the remains of Sedd El Bahr—in the distance the *River Clyde* (since spoken of as the wooden horse) filled with troops approaching the beach at S Bahr where she was run on shore—swarms of steamboats with boats in tow—all this I saw in my hurried survey of the scene

"Just after 7 30 am the S W Borderers landed and with little opposition seized and occupied De Tott s Battery where they entrenched The day wore on—reports of landings successes and checks at various points reached us but no reliable news one thing however was obvious—the enemy still held S Bahr At 7 30 pm we left our station and the ship spent the night in the Gulf of Xeros"

During the course of the first day s fighting it became evident that the arrangements for the treatment and evacuation of casualties were woefully inadequate. HMS *Queen* with the battleships *London* and *Prince of Wales* had assisted in the landing of the Australian and New Zealand Army Corps Fleet Surgeon O Leary writes

The number of medical officers of the Australian forces were wholly inadequate till the Hospital Ship (*Hindoo*) arrived but valuable assistance was rendered by medical

officers of the Fleet Myself and both Surgeons visited the transports, assisting as much as we could but the number of wounded was enormous some 3000 in five days I took over Sick Berth Stewards and a large supply of dressings also antisepsis vaccine chloroform medical comforts etc but there was no time to administer general anaesthetics One had to be content with giving an injection of vaccine in most cases re dressing wounds applying splints to fractures and administering stimulants and comforts where necessary For example in the *Ionia* there were 800 wounded with only the three medical officers of the *Queen* to attend to them at one time The Senior Medical Officer of the *London* was told by the Flag Captain to superintend the transport work this entailed much work There was not a sufficient supply of stretchers ashore so ships were instructed to furnish on average 20 from each The wounded were placed on lighters and towed to the various transports which acted as hospital ships also ships launches and pinnaces were utilized and I made arrangements for the launch and sailing pinnace to be boarded over the thwarts, each being capable of carrying eight cots or stretchers This ship supplied 36 stretchers

"Large demands for morphia first field dressings splints scalpels scissors etc were put in by cable to Malta by the Rear Admiral to replenish those deficient in ships of the Squadron In addition to tugs etc the following torpedo boat destroyers were attached to *Queen Colin Usk Ribble Beagle Fox Hound Scourge Bulldog*—all these required supervision and dressings etc General Carruthers was in executive charge of the transports and I made arrangements with him for the supply of medical stores to the *Massaraba* which was quite depleted—these were obtained from the KN Division hospital transport *Francomia*

Surgeon Hereford RN on May 4th developed a septic wound of the hand while attending a case and was later discharged to *Gascon*—a surgeon from the *Canopus* was detailed to relieve him in the *Prince of Wales* "

Maritime operations in the Dardanelles were supported by the Royal Naval Air Service and later L Aviation Francaise The initial deployment included the seaplane carrier HMS *Ark Royal* with ten aircraft on board later followed by the *Ben My Chree* In March No 3 Aeroplane squadron established an aerodrome on the island of Tenedos in rather harsh conditions The duties of the RNAS included reconnaissance spotting for guns bombing of ground forces and searching for minefields and submarines In August the first successful torpedo-bomber sorties were carried out in the Sea of Marmara Allied aircraft losses were largely due to mechanical failure until the late stages of the campaign when a flight of German Fokker monoplanes arrived Surgeons Patterson and Williams described the conditions on Tenedos and the later aerodrome on Imbros

"The squadron disembarked on April 7th and went into camp on the chosen aerodrome at the western end of Tenedos Island joining up with Commander Sampson and his advance party of 35 officers and men The camp site was a low windswept treeless plain near the sea surrounded by ridges of low hills in the midst of cultivated and irrigated vine fields It was badly drained and very dusty (from aerodrome and camp road) and some ½ mile from the nearest well so that water had to be always carried down in tanks on trolleys The site was therefore far from ideal but had to be near the machines Hot weather set in after three weeks of storm and flooding of camps and a plague of flies came There being no proper roads on the island no motor transport was landed and our ambulance remained on transport SS *Moorgate* We had no special hospital tents these were drawn as required from the military governor For some time the preserved meat ration was issued with biscuit or bread made at a Greek bakery in Tenedos town and packed out daily on mules—a distance of six miles This latter was cooked badly and rapidly went mouldy Numerous cases of gastroenteritis soon cropped up due to fly and dust infection of food and monotonous diet

The island was patrolled by a detachment of Marines drawn from the shipwrecked crews of HMS *Ocean* and *Irresistible* One unit was encamped near us as aerodrome guard At first these men were under the medical guard of Surgeon Higgins RN who was attached to the military governor living at the town of Tenedos six miles away so being on the spot we took over the duty Similar sanitary arrangements were made for this small camp and their sick were treated and housed in our sick bay A number of these marines were old men called up from

reserve some even having been previously invalided Some had completed a commission in the Persian Gulf in HMS *Ocean* just before coming to the Dardanelles They had all undergone considerable hardship and exposure at the sinking of their ships and on first being placed on the island Here for three weeks until camp equipment was procured they bivouacked in the open practically destitute as to bedding shift of clothing and cover These factors explain why a large percentage had to be treated on the sick list subsequently

During the first week of August the machines all the flying officers and 36 mechanics went to Imbros encamping on Cape Kephalo the nearest point to Suvla to carry out reconnaissance in connection with the new landing. Surgeon Williams and SBS Beaumont accompanied that part of the squadron with a portion of the medical stores while Surgeon Patterson with the two Sick Berth Reserve ratings remained at the base on Tenedos where all the repairs were still carried out We joined up with the advance party in Imbros on the 20th September The aerodrome at Tenedos was turned over to L'Aviation Francaise and all our stores and equipment were shifted to Kephalo There was much delay over the final transhipment owing to frequent northerly gales When we did at last get on board the beetle lighter sudden bad weather drove her aground and we had to disembark and go into bivouac for two days until the weather moderated and the boat could be refloated The advance party which came to Imbros for the Suvla landing had its aerodrome on that part of Cape Kephalo later occupied by the airship section and went into bivouac camp The landing place for aeroplanes was small and dangerous being near the cliffs and subjected to unexpected wind eddies It was due to the latter that a fatal accident occurred on the 19th August

'Captain Charles Collett DSO RMA (Flight Commander) was piloting a B8 tractor biplane with CPO Lacey as passenger He was turning to land when the machine nose-dived struck the earth and caught fire CPO Lacey was thrown clear sustaining a simple fracture of the right thigh sprain of left ankle and abrasions Capt Collett must have been stunned and unable to save himself CPO Keogh and PO Jones gallantly dragged pilot and passenger from the burning aeroplane sustaining burns of arms and hands By this time the officer had been so badly burned as to be unrecognisable the clothing was all but burnt away and the whole surface of the body limbs and extremities charred Consciousness was regained for a few minutes and great pain complained of so morphia was freely administered A sheet was soaked in castor oil and applied to the body as a dressing. Breathing became more and more laboured and pulse weaker Death ensued from shock in about half an hour The burial took place at the British Cemetery behind K Beach

OPERATIONS IN GERMAN EAST AFRICA

In 1914 the German Vice Admiral von Spee had a powerful force in the Pacific the German East Asiatic Squadron The main part of the Squadron was later destroyed in the Battle of the Falkland Islands but prior to this von Spee had detached two light cruisers *Emden* and *Konisberg* to the west The *Konisberg* sought refuge in German East Africa eventually becoming cut off by British forces in the River Rufigi delta A number of British ships took part in this operation including HMS *Mersey* a monitor Temporary Surgeon Shaw writes

"In the middle of March the crew was taken out of the ship at Sheerness and the ship prepared for towing The crew were taken to Plymouth by train and there joined HMS *Trent* (a commissioned merchant ship) along with the crews of HMS *Severn* and *Humber* On the *Trent* a general Sick Bay was formed under Fleet Surgeon Richards only the records of the various ships' companies being kept separate

"On the 3rd June the ships arrived at Mafia Island German East Africa by then in our hands and there hitted out the monitors again the crew joining the *Mersey* as soon as the ship was ready

Extra plates as protection were placed on the sides of the ship and bulwarks on the upper decks and plates to extend the protection of the shields on the guns On the 6th July 1915 the *Severn* and *Mersey* went up the Rufigi delta and engaged the *Konisberg* Early in the action a 4·1 inch high explosive shell burst on the left side of the gun shield of the fore 6 inch gun it caught the edge of the armour shield and carried away the extra plates The sight setter (John Ormond AB) had his right arm removed at the shoulder he

lived long enough to be brought to the dressing station but died before anything could be done for him The trainer of the gun (Colin Macdonald AB) had his head removed from his body by a portion of the gun shield and was killed instantly CPO George Ransom was killed by fracture of the skull Henry Haines (cartridge number) was killed and had left leg removed above the knee vault of skull smashed and body badly charred by ignition of cordite charge and by the igniting of his clothing Alexander Henderson AB another member of the gun s crew was badly burnt on arms legs shoulders neck and head by the ignition of the cordite charge the burns were superficial and there were none on the trunk Shock was profound and patient died at 7 pm on Wednesday 7th July on SS *Bayore* for passage to Zanzibar Petty Officer Henry Sayoe (gun layer) had compound fractures of middle and little fingers of left hand injury to thumb and burns on neck and both ankles he was sent to Government European Hospital Zanzibar and has since rejoined the ship and is carrying on his duties Sick Berth Steward Reginald John Rolls whose station was to the after dressing station in one of the cabins protected by the armour of engine room had gone forward to the sick bay when the shell hit and a piece came through the forward bulkhead and caused a compound comminated fracture of the radius severing the radial and interosseous vessels Haemorrhage was controlled by a tourniquet antiseptic paste was squeezed into the wound and first aid dressing applied Redressed with the other wounded in the evening on HMS *Trent* he was sent to European Hospital Zanzibar where he died under anaesthetic Two of the men killed were wearing the service kapok swimming waistcoats which were recommended for wearing in action as a protection from shrapnel These waistcoats burnt away freely and it was necessary to turn the hose onto the body of Haines in order to extinguish the flames The presence of these waistcoats in my opinion materially added to the injuries received both by the killed and wounded

Since coming out to a tropical climate the general health of the crew has been quite satisfactory especially taking into account the high average of age A great deal has been due to the possession of a refrigerator so that it has been possible to have had no days on salt provisions Tropical diseases have not been much met with only two cases of malaria occurring and it is doubtful if these cases were not recurrence of old standing disease Influenza has prevailed to a considerable extent and diarrhoea especially during the period on HMS *Trent* Heatstroke has caused a considerable number of cases but only one in which any anxious symptoms occurred The lack of a microscope is greatly felt in dealing with cases of malaria or suspected malaria A great number of the heads both officers and men were cracked as a result of the action with the *Konisberg* and as these could only be temporarily patched at Zanzibar this did not improve the sanitary conditions already somewhat defective and large amounts of disinfectant were required to keep the closets in a sanitary condition '

MINESWEEPING

The Hague Convention of 1907 had forbidden the laying of mine fields outside an enemy's territorial waters, and this measure was strongly supported by both the British and German delegations Mines rather like torpedoes were regarded in some circles as being unfair and damned un-English Nevertheless the Germans began laying mines immediately after the outbreak of war and British counter measures as with submarines were found wanting. Many trawlers manned by reservists were hastily pressed into service, and some of these vessels had medical officers on board, including medical student 'Surgeon Probationers' One such vessel was the steam yacht HMS *Sagitta* built in 1908 by Camper and Nicholson and chartered by the Admiralty from the Duc de Valençay *Sagitta* spent most of 1915 in the North Sea although in the last year of the war she accompanied HMS *Cochrane* to Russia Temporary Surgeon Moore writes

"All the executive officers and most of the crew save the stokers are amateurs When she first came out nearly all the ABs were graduates or undergraduates of the University of Cambridge As these have one by one taken commissions in the Army or RNVR they have been replaced as far as possible by men of the same sort The only regular serviceman in the ship is the signal boatswain and his warrant is temporary There are also several youths who were boy scouts before the war This ship flies on occasion the flag of the Admiral of Minesweeping Rear Admiral Edward Charlton CB

On one occasion while going to the rescue of the crew of a merchant steamer that had just been mined a patrol trawler that was ahead of us struck a mine and sank in a few seconds. Two of her crew were never found. Five bodies were picked up and six men alive of whom five were more or less hurt. It was striking how the men were either killed outright with gross injuries such as fractured skulls and pelves or were but slightly hurt. These men were taken to Shotley.

"It seems impossible to calculate what the effect of a mine explosion will be. On two occasions floating mines blew up close to the ship perhaps 50 yards away causing damage to glass and woodwork and the like. Yet no one on board save the cat who suffered from nervous shock 'bunk' woken up from sleep by a cascade of breaking glass was any the worse not even a boy who was seat flying across the galley into the cook. It was noticeable that the force of the explosions caused windows to break and woodwork to split outwards towards the source of the shock.

"The effect on the ship's company of days of continual explosions and of seeing ships sunk in an area in which they were working was slight beyond an increased alertness at any sudden noise. Yet I have seen at Lowestoft a man with his nerve destroyed from these very causes.

An outbreak of measles luckily did not spread beyond two cases H Harvey AB and R C Morris Warrant Engineer. Another case occurred in a paddle steamer. Calms are rare and fine weather none too frequent. In the parts north of the Wash as far as our experience goes the weather is usually bad or at least unpleasant and everywhere it is uncertain.

One night off the Belgian coast the sea fire was very brilliant (a night when we particularly wished for darkness) and I could read my watch by it on the boat deck, 20 ft above the sea. In the early Autumn large numbers of birds settled on the ship grey back crows robins shrikes and others.

FURTHER READING

The Great War at Sea 1914–1918. Hough R. Oxford University Press 1983.
The Sailor's War 1914–1918. Liddle PH. Blandford Press Poole 1985.
The Surgeon Probationers. Allison RS. Black staff Press Belfast 1979.



A Cariezia of Commodores!
Front left to right Surgeon Commodore A L Revell QHS Surgeon Commodore M Hatfield QHP and Surgeon Commodore F R Wilkes MBE QHS

J roy nav med Serv 1990 76 175

Association of Service Physicians

The eleventh annual meeting of the Association of Service Physicians was held at the Royal Army Medical College Millbank on 16 February 1990 49 members attended

The Chairman for the first session was Air Commodore D H Hull RAF Consultant Adviser in Medicine Following an opening introduction and welcome by Major General I P Crawford Commandant and Postgraduate Dean Royal Army Medical College Millbank Surgeon Commander M L Cowley presented a paper on Thrombolysis in England giving the results of a survey of district policies and treatment rates Though thrombolytic therapy for acute myocardial infarction is now widely used there is considerable variation in treatment rates and a significant shortfall in the provision of this effective and life saving treatment In the second paper Squadron Leader N A Harrison gave a very concise review of the use of various parameters for assessing disease progression in HIV 1 infection from asymptomatic carriage to the symptomatic state and drew particular attention to the value of measuring Neopterin and Beta 2 microglobulin levels In the third paper Major M J Wood presented details of his experiences using intravenous Enoximone to treat patients with severe cardiac failure This relatively new haemodynamic stimulant may be very beneficial but its effects are sometimes pronounced but not always entirely predictable or desirable and he recommended very close haemodynamic and electrocardiographic monitoring if the agent is used

The second session with Surgeon Commander R H Taylor Professor of Naval Medicine in the Chair was devoted to Medical Audit in the Services Major W M Mehn Wing Commander D J Rainford and Surgeon Commander R J Clark gave reviews of the experiences of audit at the Queen Elizabeth Military Hospital Woolwich the Renal Unit at Princess Mary s Hospital Halton and the Royal Naval Hospital Haslar These three very interesting and different presentations were followed by a stimulating discussion period and the meeting concluded with lunch in the RAMC Headquarter Officers Mess

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Emergency Planning '91—An International Conference

We have been asked to draw our readers attention to this event which will take place from 8 12 September 1991 at Lancaster University Papers are required on all aspects of Emergency Planning and Disaster Management Parallel sessions an exhibition and post conference workshops will be held

Further details are available from

Emergency Planning 91
Conference Office
Bowland College
Lancaster University
Bailrigg Lancaster LA1 4YT
United Kingdom

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The Royal Naval Medical Club Dinner 1990

The annual dinner of the Royal Naval Medical Club was held in the Painted Hall, Royal Naval College, Greenwich on Friday 28 September 1990 when **Surgeon Vice Admiral Sir Godfrey Milton-Thompson KBE QHP FRCP** Medical Director General (Naval) gave the following speech

I am delighted to welcome as our guest of honour the Earl of Arran Parliamentary Under Secretary of State (Armed Forces) the Minister whose guiding hand is on all matters medical Lord Arran took office at a particularly important time for the Medical Services He did his national service as a Grenadier and spent some time in the newspaper industry (and many of you will remember his father's entertaining column in the old *Evening News*) before joining the Government as a Whip in 1987

It is a great pleasure to welcome again the Admiral President Admiral Sir Brian Brown As Second Sea Lord and Chief of Naval Personnel he is the Navy Board Member concerned with medical affairs As Admiral President we are indebted to him for allowing us to dine in this incomparable place once more We welcome Vice Admiral Sir Barry Wilson Deputy Chief of Defence Staff (programmes and personnel) Sir Barry Wilson is the Central Staff Officer who has to reconcile the irreconcilable the interests of the programmers and of personnel forever in conflict The mediaeval philosopher Nicholas of Cusa propounded the Coincidence of Contradictories believing that such conflicts could only be reconciled in Heaven I am sure Admiral Wilson would agree I am very grateful to both Admiral Brown and Admiral Wilson for their wise counsel and constant support during the time when I have had to combine the office of Surgeon General with that of Medical Director General of the Navy

It is a particular pleasure to welcome my old friend General Henry Beverley who took over as Commandant General Royal Marines earlier this year The Naval Medical Service has a very close relationship with the Royal Marines and many of our assets are dedicated to them in war In conflict we have a great need for the help of their bandsmen Indeed we could not have provided the medical support to the Falklands operation without the help of the Royal Marine Bands Reduction of the bands as a savings exercise is a great mistake which we shall come to regret

Professor Margaret Turner Warwick is President of the senior Royal College the Royal College of Physicians of London and has the distinction of being its first woman President in nearly four hundred years It is therefore a particular pleasure for me and an honour to the Club that she has consented to dine with us tonight

I am also delighted to welcome my two friends and colleagues the Medical Directors General of the Army and Royal Air Force. General Tony Shaw retires at Christmas and we wish him many happy years of sunshine days Air Vice Marshal Nigel Mills is to succeed me as Surgeon General and we are delighted to have him with us tonight on the eve of his elevation to Air Marshal I am also glad to welcome Brigadier Jill Field Director of Defence Nursing Services Group Captain Liz Sanderson Matron in Chief of the Princess Mary's Royal Air Force Nursing Service and the Chaplain of the Fleet Archdeacon Michael Heuley Finally we could not dine here without the consent of the Commander of the College Commander Sanvage, whom we are delighted to have with us tonight and without the help of the Mess Manager Geoff Holloway and his staff who have worked hard to give us such a delightful evening All our guests here tonight are most welcome

People often ask why do things take so long in the Ministry of Defence? Why is the whole

process of decision making so prolonged? In the time that remains to me, perhaps I can give you all some idea from my own experience

It is six years since I first presided at this Dinner and those with long memories will recall that we then stood at the threshold of Mr Heseltine's major reorganisation of the Ministry of Defence with the creation of a stronger central staff and of the Office of Management and Budget to which I shall return and with the Yellowlees report on the Defence Medical Services. The Surgeon General I then believed would be in a very difficult position as both purple-hatted and Head of his own Medical Service. And so it proved. By the time that I took office it was evident that something had to be done. It took two years to find a solution which was to give the Surgeon General single service staffs the most serious omission of the original structure and a one star deputy. Surgeon Commodore Mike Hatfield took over this task and has got the Naval Medical Service back on its feet after the neglect that it inevitably suffered during my first two years as Surgeon General. We should all be very grateful to him.

Two years was really much too long. First however sensible reorganisation may seem it will inevitably produce problems and we must be able to respond to these quickly. The machinery of the Ministry of Defence does not readily allow speedy decisions. Secondly ever lurking in the background is the spectre of the Treasury. I have no quarrel with proper financial accountability indeed as a Taxpayer I welcome it. We spend public money and in spending it must be ultimately accountable to Parliament. However the Treasury who interfere more and more at a lower and lower level throw larger and larger spanners in the works. Preparation of the Long Term Costings the annual budgetary exercise is also cumbersome and sometimes shows remarkable feats of creative accounting. Savings measures are suggested without sensible consultation and the decision makers can be given optimistic figures of what the savings might be and this can disguise the real issues. This can result in more delay. The system is far too rigid.

The New Management Strategy or NMS was devised as a means to cut through this desperately inefficient system. The intention of the NMS is to allow managers to manage and to delegate decision making and responsibility to those who really know what has to be done at the 'coal face'. This is excellent in concept and has been worked on with great enthusiasm by the staff. Will it work? I have two reservations. The Treasury wish to retain power in their hands which should properly be delegated. Secondly there is as yet insufficient information about incentives but without a good and high profile incentive scheme NMS will fail because human nature needs incentives. Let me explain. As a pilot exercise we introduced a limited list for prescriptions which saved the Defence Budget £171 000 in the last financial year. We didn't see any of it! Contrast this with the National Health Service where up to 50% of the sums saved are available to managers in the following financial year to improve the service.

There is another reason why decision making is so drawn out in the medical area. Too often perfectly sensible ideas are put forward by my directorate only to be questioned by the one hundred and one instant experts. If our highly trained professionals could only be trusted in the medical as in many other fields I am sure decision making would be simpler and just as sound.

Let me turn to happier topics. The Dental Services continue to maintain their high quality service to the Navy and this is appreciated by the Fleet. Nevertheless, the Dental Services are small and getting smaller. I have no doubt that they must consider coming closer to the doctors. Do we really need a separate command structure? Why should we not have a common promotion list? Why should dental officers not be considered for any Surgeon Rear Admiral's appointment or even as MDG(N)?

The Queen Alexandra's Naval Nursing Service is facing up to the introduction of Project 2000 within the profession at large. I have commented before on the problems which I believe this will bring about in the National Health Service but I believe the dispositions that the Matron in Chief has made avoid its worst effects within the Service. Recruiting of nurses has been given a high priority and the introduction of the female Medical Assistant for which I can claim some personal credit is proving very successful. Meanwhile all our medical, nursing and dental staff have done wonders in the face of severe staff shortages particularly in the hospitals and for that I am very grateful. Our excellent relationship with the NHS in nurse training is bearing fruit and our civilian nursing colleagues are likely to be very understanding should we be forced to

interrupt nurse training in order to meet our operational commitments in the Gulf

The Medical Royal Naval Reserve go from strength to strength and it is gratifying to see so many here tonight They now have a much clearer understanding of their operational role and I was delighted to visit their very successful training camp at Staghton [the Army Medical Services Field Training Centre] in May of this year The RNR are always ready to help the Regulars out and may yet be called upon for help with the crisis in the Gulf I am very glad once again to record our debt

Ultimately the Medical Service Regular and Reserve exist to support the Armed Forces in war In considering our response to this requirement let me first make a general point which is often poorly understood by operational commanders until the shooting starts The expectations of the sailor and soldier are now quite different to those of their forebears in 1914 Life was then hard brutish and short Medicine and surgery were primitive Now our people are accustomed to the high standards of the NHS The wonders of modern medicine and surgery are displayed on television screens with great regularity Soldiers and sailors know about these things but so do their wives and mothers The general public expects the Armed Forces to have the best medical support in war We must not fail them in this respect.

The current operational commitments in the Gulf may well stretch our resources to the full At present we believe that in the days to come we can just meet what is required and if the worst comes to the worst, I am confident that the Medical Services will acquit themselves as well as ever before But in a year or two shall we still be able to meet our commitments? We must make sure that we can This will need forward thinking on the part of all of you bt innovative think laterally be creative be bold

On Monday I hand over my charge to Air Marshal Mills as Surgeon General and to Admiral David Lammiman as Medical Director General of the Navy I commend them to you and am confident that they will have the support that I have enjoyed There is still a lot of uncertain weather ahead but I remain quietly confident about the future and my best wishes go with you all

The Earl of Arran.. Parliamentary Under Secretary of State (Armed Forces) replied on behalf of the guests.

Thank you Sir Godfray This occasion marks the end of your long and distinguished career in the Royal Navy culminating in your successful tenure of the important posts of Medical Director General (Navy) and since 1988 of Surgeon General of the Defence Medical Services I cannot let it pass without paying tribute to your strong and wise leadership in a time of change and turbulence and wishing you and Lady Milton Thompson every happiness for the future

May I also congratulate Surgeon Rear Admiral Lammiman on his appointment as Medical Director General (Navy) and wish him every success in his challenging new post—and he has my assurance that challenging it will be

As I stand before you I cannot help being conscious of the traditions and achievements of the Royal Navy and its medical service which over the centuries has demonstrated its capacity to grow develop and adapt to change I understand that a few ships in the Navy of Henry VIII had surgeons or chirurgeons as they were known as early as 1530 By the mid 17th century they had achieved Warrant Officer status they were rarely seamen and were recruited by the Company of Barber Surgeons—by press ganging if necessary From 1626 twopence a month was deduced from the wages of every seaman to contribute to their pay and a major reform in 1652 both allowed every surgeon to have a mate and raised his pay to £2 10s a month In addition between £3 and £10 was provided to allow him stock his medicine chest

Further advances in the quality of medical care in the Royal Navy came in the mid 18th century with the appointment of senior and junior physicians to oversee the work of ordinary ship surgeons while on shore the naval hospitals at Haslar and Plymouth were built and began treating the sick and wounded

Yet mainly because of the appalling conditions in which seamau had to live during the Revolutionary and Napoleonic wars it still meant that half the fatal casualties were due to disease compared with one in 12 which were due to enemy action It was largely due to the efforts of individual naval surgeons—James Lind Gilbert Blane and Thomas Trotter—that fresh fruit and vegetables began to be issued to sailors to combat scurvy

Not until 1843 did naval surgeons attain commissioned rank. but in this century the Royal Naval Medical Service has shown its mettle in two world wars and as recently as

1982 in the Falklands Campaign and I know that together with its sister services the Royal Naval Medical Service is playing an important part in our Middle East build up

Looking to the future we face in Defence the challenge of adapting to the new and promising era of East/West relations The Options for Change on which the Secretary of State reported to Parliament at the end of July identifies ways in which our forces might be restructured by the mid 1990s in the light of these developments As he said the pace of change will depend on the signature and implementation of a CFE agreement on the progress of the 2 plus 4 talks, and on how quickly Soviet troops leave Eastern Europe and other Soviet forces are run down The precise shape of our contributions to NATO must reflect decision with our Allies and with the NATO authorities

Since then the 2 plus 4 talks have succeeded in bringing about a momentous agreement by which the two Germanys are about to be united. Work is continuing on devising structures for our forces appropriate to the new security situation The framework which the Secretary of State announced for the regular forces envisaged in broad terms by the mid-1990s forces whose regular manpower would be about 15% less than current numbers Civilian numbers will be similarly reduced Volunteer reserves and reservists will continue to play a key role

Revised figures for defence expenditure will be announced in the Chancellor s autumn statement as part of the Government s decisions on the total public expenditure programme Some announcements have already been made about constraining expenditure in the current year which are consistent with longer term plans

As the Secretary of State said the new force structures which we envisage can give us strong and reliable defences in changing circumstances and at an affordable cost In the support area of which the Medical Services are a vital and important part our aim is to achieve reductions at least proportionate to those being made in the front-line I should stress that we intend to make the necessary changes in a proper and orderly way

As you know even before the Options for Change announcement the Surgeon General had commissioned a review of Service hospitals in the United Kingdom I expect to receive shortly the recommendations of the review Meanwhile we shall be working on the structure of the medical support including hospitals which the Armed Forces require in the new circumstances We shall have to decide on what is the appropriate level of medical support required to meet the new operational tasks in the light of the constraints of affordability But of course it goes without saying that so long as we have Armed Forces they will need effective medical nursing and allied personnel of the highest quality and dedication The precise mix of these personnel and the balance between regulars and reserves will need a good deal of detailed study in the coming months

A period of change always offers a tremendous challenge to management particularly when tasks are changing and resources come under pressure The challenge facing you in the Naval Medical Service and your colleagues both in the other Services and in other activities in support of our defence task is to adapt to these changes in ways which lay the foundation for continued professionalism and skill As in all parts of the Defence business we will need to ensure that we get value for money out of all our activities I have a special responsibility on behalf of the Secretary of State to oversee the Defence Estate and I am determined to see that we make the best possible use of the very considerable assets we possess in terms of land and buildings and dispose of anything which is unused or under used In this way we can not only reduce the administrative and other costs associated with maintaining bricks and mortar and ensuring their security but also to obtain much needed funds for investment in new and better facilities and equipment

I believe also that we need to think of new and more radical ways in which our requirements can be met We need to harness in support of defence the resources of the nation We can do this in a number of ways For example volunteer reserve forces represent a relatively low cost investment in peacetime and I am sure that we ought to look very carefully at the possibility of increasing the tasks which we can assign to our reserve forces subject of course to the constraints of recruitment and retention We can also harness the resources of the nation by making wider use of British industry through contractorising support activities where this is more efficient than doing them in house I believe that we need to look at both these possibilities in the medical as well as in every other field

Britain possesses a precious asset in its doctors dentists and nurses and all the professions ancillary to medicine I can only speak as a layman but I believe that our people are

second to none and that we in Defence should ensure that we obtain by one means or another an appropriate share of the national

Finally may I thank you Sir Godfrey for inviting me to this dinner and for the hospitality and warm welcome which has been provided to me The Royal Naval Medical Service has a record of achievement and a tradition of which you can all be proud I believe it still has a bright future given confidence in itself and the ability and willingness to adapt to change now as it has in the past

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The names and addresses of subscribers to the Journal of the Royal Naval Medical Service are being transcribed from a card index system to a computer database which it is hoped will be established by March 1991 in order to ensure that this database is as far as possible kept up to date subscribers receiving issues which are not correctly addressed are invited to complete the tear off portion below and return it to the Editorial Secretary The form may also be used to notify future changes of address

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Journals Received

The following Journals are received regularly and are available either in the Medical Library at RNH Haslar or at the Institute of Naval Medicine

Acta Medica et Biologica (Nigata University School of Medicine) Annals of Medicine Australian and New Zealand Journal of Surgery British Medicine British Medical Journal Bulletin of WHO The Charles Bell Journal Dokumentation Sozialmedizin Guys Hospital Gazette International Review of Armed Forces Medical Services Journal of Irish Colleges of Physicians and Surgeons Medical Teacher Journal of Naval Science Journal of the Royal Army Medical Corps St Thomas's Hospital Gazette SPUMS Journal Tropical Diseases Bulletin Ulster Medical Journal War and Society WHO Chronicle World Health Forum

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Abstracts—Papers by Royal Naval Medical and Dental Officers

Walker AJ, Leicester RJ, Nicholls RJ, Mann CV. A prospective study of infrared coagulation, injection and rubber band ligation in the treatment of haemorrhoids. *Int J Colorect Dis* 1990;5:113–116.

One hundred patients with non-prolapsing and one hundred with prolapsing haemorrhoids were allocated to receive conventional treatment (CT) by injection sclerotherapy or rubber band ligation or infrared photocoagulation (IRC). Significantly more patients with non-prolapsing haemorrhoids were symptom free after IRC (81%) than CT (59%) at three months ($\chi^2=4.4$ $p=0.05$). There was no significant difference in the outcome at one or four years. Likewise for prolapsing haemorrhoids there was no significant difference in the outcome of IRC or CT at three months, one or four years. However recurrence of prolapse was more common after IRC (54%) than rubber band ligation (RBL) (27%) at one year ($\chi^2=3.46$ $p<0.1$). IRC was significantly less painful than CT ($p<0.001$). IRC is a safe, rapid, non-invasive alternative to CT, which is acceptable to the patient and gives similar results though RBL provides more rapid and longer lasting relief from prolapse.

A longitudinal investigation by darkground microscopy and culture studies of the subgingival microflora of abutment teeth following the insertion of bridges **Colin R Prinstland** BDS, MGDS (RCS). A report submitted in partial fulfilment of the degree of Master of Science in Periodontology.

In this investigation both darkground microscopy and culture techniques have been employed to determine if the insertion of bridges alters the subgingival microflora of the adjacent abutment teeth.

Subgingival plaque samples were obtained before insertion of bridges and at various times after insertion of bridges using Calgitex swabs. The samples were transported to the laboratory for processing in Reduced Calgon Ringer's solution.

Dark ground microscopy was performed within one hour of the time of sampling in order to determine the proportions of cocci, motile bacteria, spirochaetes and rods.

Culture studies were employed to determine the various proportions of the total anaerobe count contributed by streptococci, Gram negative anaerobes, black pigmented bacteroides and facultative anaerobes. Furthermore the ratio of aerobes to anaerobes was determined.

No common trends were discovered by either technique in the patients sampled. Certain sites where there was sub-optimal plaque control did exhibit a shift towards a Gram negative anaerobe flora following the insertion of bridgework. Oral hygiene is suggested as the most important factor in determining the presence or absence of a change in subgingival microflora.

Chandler HA, Archbold GPR, Gibson JM, O'Callaghan F, Marks JN, Pethybridge RJ. Excretion of a Toxic Dose of Thallium. *Clinical Chemistry* 1990;36/1506–1509.

We report a successfully treated case of severe thallium intoxication that required 95 days of assisted ventilation and 224 days of hospitalisation. Monitoring of the patient for 500 days by measuring thallium in the whole blood, serum and urine is documented, and the role of the laboratory and the utility of the measurements are considered.

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Book Reviews

ABC of Resuscitation. 2nd Edition Ed T R Evans Pp 72 BMJ June 1990 £6 95 Abroad £8 50

This is an important book, because it details the current standards for resuscitation in the UK from kerbside Basic Life Support to Intensive Care Unit management Its intended audience is equally wide Written by a distinguished team from the Resuscitation Council (UK) it follows the familiar ABC series format and contains individual articles on Basic Life Support Advanced Life Support in General Practice, Resuscitation for Ambulance Crews, Resuscitation in Hospital Major Trauma Life Support and much more

Douglas Chamberlain's account of the management of ventricular fibrillation is superb and contains an important message about the implications of semi-automatic defibrillators important reading for General Practitioners and Medical Planners The account of Advanced Life Support in General Practice provides useful background information although the suggestion that the best way to raise a vein for cannulation is to use a cuff inflated midway between the systolic and diastolic (arterial) pressures should be corrected Doctors dealing with cases of near drowning will be helped by the account here although the author betrays his centre of excellence origins by breezily suggesting that hypothermic patients be rewarmed on bypass Perhaps the next edition could contain a discussion on the usefulness of more readily available methods of rewarming, such as peritoneal lavage using microwaved fluids

Trainers will find the article on Training and retention of skills very enlightening It gives a good account of the syllabus and organisation of resuscitation courses at all levels

The weakest section deals with Basic Life support It should contain enough well organised information for non specialists to achieve a working knowledge of resuscitation without having to read the whole book Unfortunately important items such as the introduction of cricoid pressure are hidden in other chapters of the book A beginner would do better by starting with the resuscitation chapter of the current edition of the St John/Red Cross First Aid Manual

I would recommend doctors and nurses with a particular interest in resuscitation to look at Peter Baskett's new book It contains a very similar account of resuscitation but has the advantage of a more integrated (single author) approach In fairness the editor's introduction to the ABC does make the point that this is a guide to resuscitation rather than textbook or manual but that should not make it impossible to provide useful cross-references

As junior anaesthetist with a special interest in resuscitation I learnt a lot by reviewing this book Whatever your specialty readily access to the ABC of Resuscitation is as important as having an up-to-date BNF to hand what is more it is cheaper!

GLG

ABC of Transfusion Ed M Contreras Pp 65 BMJ June 1990 £10 95 Abroad £13 00

The 'ABC series of articles which appear in the *British Medical Journal* have a well-deserved reputation for brevity clarity and clinical relevance This collection of 16 articles which appeared in the BMJ this year is no exception The editor is the director of one of the foremost Regional Transfusion Centres and she has assembled an exceptional team of contributors who have summarised their areas of expertise in a uniformly accessible and authoritative manner I can find little to criticise in this reasonably priced A4 sized paperback and much to applaud It will be of relevance to anyone who is involved in the chain of collect

ing testing ordering and administering blood and blood products It would be an ideal primer for physicians surgeons anaesthetists and pathologists and would answer many of the questions which arise in clinical practice The chapters on Human Albumin solutions and Massive Blood Transfusion are particularly praiseworthy summaries of current practice

The book is well produced with clear typeface good use of colour and black and white photographs and numerous informative tables This book is highly recommended for personal purchase as well as departmental and ward libraries

CMJ

Queen Alexandra's Royal Naval Nursing Service

Kathleen Harland MA

This book was commissioned to be written by Kathleen Harland for the QARNNS Centenary celebrations in 1984. The high cost of publishing and corresponding lack of funds put the project into abeyance until it was brought to the attention of the Editorial Committee of the Journal of the Royal Naval Medical Service. Only through the financial backing of the JRNMS who have acted as publishers has it been possible to print the book.

Mrs Harland has written a comprehensive account of the History of QARNNS from their inception in 1884 up until 1988. It is a book which combines history, general interest and some anecdotes in an easy to read style. She relates the initial antipathy to females being attached to the Royal Navy, the conditions under which some QARNNS Officers served in WW2 and describes the trials of service during the Korean War and latterly the effect of the Falklands War. The book will be of interest to historians in particular the comprehensive tables at the back of the book which cover a diversity of subjects including Honours and Awards and Establishments where QARNNS Officers have served. A wide selection of photographs provide contrast and further interest for those people who may prefer just to browse through the pages.

The book costs £4.50 which includes postage. For those who can collect direct from the Office of Surgeon Commodore (NMT) the cost will be £3.50. To order a copy of the book you are requested to complete the form below and send to: ISTO, Office of Surgeon Commodore (NMT), Monckton House, Institute of Naval Medicine, Alverstoke, Gosport, Hants PO12 2DL.

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Letters to the Editor

Sir

HEAT ILLNESS

Ian Riddell (Summer 1990 issue) has convincingly demonstrated the value of generous intravenous fluids (2 l in 15 min) in the management of severe heat illness. He has once again shown that it is possible to conduct outstanding research of direct military relevance at a Service establishment without sophisticated equipment. Many Medical Officers should be encouraged to do similar work in evaluating the medical consequences and care of casualties during training.

It is however only fair to point out that a rapid water bath with finning was not the recommended technique for evaporative cooling.[1] Heat loss in a water bath is largely by conduction and does not take advantage of energy loss by the latent heat of evaporation. Heat loss by the latter route is the reason that water in unglazed amphora becomes cool when placed in the sun. Khogali[2] and Al Aska[3] have demonstrated the practical efficacy of evaporative cooling, when the subject is stripped naked soaked with tepid water on a stretcher and fanned.

When teaching recruits training staff or paramedical colleagues it is important to emphasise the recognition of severe heat illness and the immediate measures that can be taken. The simplest objective measure of severity is the rectal temperature and evaporative cooling remains the best first aid treatment in the field. Intravenous fluids are vital when the patient arrives at a medical centre and should be given at the earliest opportunity.

Heat illness is a spectrum: heatstroke and heat exhaustion are simply different degrees of the same condition and I agree that they could well be abandoned, although terms in such common usage are likely to persist. What is important is to identify the severity of heat illness both as a guide to treatment and to compare patients. A rectal temperature of ≥40 C is an arbitrary but convenient way of identifying patients with severe heat illness in need of immediate treatment.

SIMON TRAVIS
Gastrointestinal Research Unit
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Oxford OX2 6HE

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The author was invited to reply

Sir

I would first like to thank Simon Travis for his kind comments. I must still however question the value of evaporative cooling as more than a first aid measure. Wyndham *et al*[1] achieved cooling rates of 0.04°C per min when cooling their experimental subjects in water—a slightly higher rate was reached by simply sitting them on a stool in front of an air movement[2] also produced a cooling rate of 0.04 C per min.

We and Khogali[3] reported cooling rates of 0.31°C per min in healthy subjects in a body cooling unit but these results were not repeated when real heat casualties were treated in this unit with falls of only 0.05 C per minute[4]. Cooling *et al*[5] used intravenous fluids and immersion in a large tub of ice water and reported falls in rectal temperature of 0.15 C similar to my findings using intravenous fluids only.

Finally I must point out that the Mecca pilgrims fall into a mixed picture between classical heatstroke caused by high ambient temperature and heat described by Austin and Berry[6] and exertional heat illness caused primarily by exercise. They are therefore in a different age group possibly suffering from a different disease process and do not compare directly to otherwise young men suffering from pure exertional heat illness.

D I RIDDELL

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Editorial Note All correspondence in this subject is now closed

S[illegible]

DOES EXPOSURE TO CS GAS POTENTIATE THE SEVERITY OF INFLUENZA?

Surgeon Lieutenant Lambert has recently described an outbreak of influenza A at the Commando Training Centre Royal Marines (CTCRM)[1]. In his article he describes the potential clinical severity of genuine influenza (as opposed to other flu like illnesses) and in his final discussion highlights the significant disruption to training that can ensue from such an outbreak.

I should like to add my own personal observations of one particular aspect of another outbreak of influenza at CTCRM again with emphasis on its intervention with the training programme.

Toward the end of the Autumn term 1988 CTCRM experienced another outbreak of influenza this time of the type A virus. I was fortunate enough to be based at CTCRM as part of the Royal Marines Archers Training Research Project during the period. At the time of the influenza outbreak three training troops had already been recruited to this project which meant that accurate records of influenza episodes affecting these troops were being kept.

Between 22 November and 12 December ten recruits from these troops were admitted to the Medical Centre and significant flu like symptoms of the type described by Surgeon Lieutenant Lambert. Examination of acute and convalescent serum specimens for complement fixing antibodies confirmed significant rising titres to Influenza A virus. The distribution of these admissions over time is shown in Fig 1.

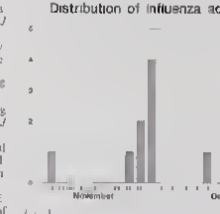


Fig 1

On the morning of 1 December five members of one troop were admitted with typical flu like symptoms (although one of these did not subsequently demonstrate a rise in antibody titre to Influenza A). All responded to bedrest and symptomatic antipyretic treatment. Clinically one recruit was thought to have a secondary pneumonia but this was not confirmed radiographically. Further questioning of these recruits revealed that on the afternoon prior to admission their troop had been practising gas drills as part of their NBCD training and had experienced brief exposure to CS gas with the consequent typical respiratory irritation.

It is interesting to speculate on the potential effect on the respiratory tract of the combined assault of CS gas and Influenza virus. Clearly the numbers reported here are far too small to draw any firm conclusions but this combination is likely to represent a significant insult to the respiratory epithelium. Further the forced expectoration induced by the CS gas represents a presumable advantage to the virus in terms of its spread to close contacts. Fortunately none of these recruits appeared to suffer any significant long term sequelae although one experienced problems with a protracted non productive cough and breathing difficulties on exercise well into January 1989 despite the intervening two-week Christmas leave period.

Other similar admissions during this time came from a cross-section of the personnel at CTCRM both those under training and permanent staff and a number of these were also shown serologically to have had Influenza A infection. Nonetheless, I feel that the apparent association between flu like troops gas drills and the precipitate nature of the admission of the cases described is worthy of note for training establishments whose winter training programme includes NBCD drills of this nature during

the course of an outbreak of an [illegible] tory tract pathogen

C PIPKIN
Surgeon Lieutenant Commander RN
Senior Specialist in Pathology
Royal Naval Hospital
Haslar

REFERENCE

1 Lambert AW. An outbreak of Flu [illegible] Sci 1990 76 75–77

Sir

I am most interested to read the report by Bell and Dewar (*JRAMS* 1990 76:79–82) in which their policy of operating at sea on elective cases is justified for reasons of effic cacy. I would have completely agreed with them if they had limited their choice of anaesthesia to local techniques but to have used general anaesthesia in this c rcumstance is completely unjustified in my opin on. I am also against the use of general anaesthesia for emergency surgery at sea in peace time in anything other than exceptional circumstances. My reasons are as follows

1 It is very easy to kill someone with a general anaesthetic and extremely difficult to do so with minor surgery

2 Despite claims to the contrary, choice of drugs and equipment are limited on board a carrier compared to the hospital situation

3 Monitoring facilities are just about up to the minimum standard but far below those of most UK operating theatres

4 A skilled assistant is not available at sea throughout the anaesthet c

5 There is no surgical or anaesthetic back up and no assist nce available from the many other specialties available in a hospital

To have to wait for m-nor surgery should cause little inconvenience to the servicemen or the service and I doubt whether operating at sea has very much impact at all on the work load of the hospital service. Although it is obviously useful to the service to have its men returning to work 48 hours after surgery I do have my doubts about the morality of this. I would certainly not want to return to work on a rolling ship 48 hours after an inguinal herniorrhaphy!

Whilst th[illegible] n to us in an [illegible] t is importa[illegible] of elective perce[illegible] double inguin[illegible] the death r[illegible] surgery t[illegible] would almost c[illegible] He In addit o I cannot believ th t m[illegible] d al would give in his given truly uni t ed consent

The argument equating the anaesthetist on board HMS *Ark Royal* with his colleague in RNH Gibraltar is fallacious. The latter is usually a more experienced individual and always possesses the Fellowship of the Faculty of Anaesthetists. In addition he has considerably more facilities at his disposal

I would have hoped that this use of local anaesthesia on 115 occasions, together with realistic exercises of clinical scenarios (as used by the rest of the Royal Navy) would have been quite sufficient to maintain the surgical team in an acceptable state of readiness for any emergency and would have identified any deficiencies. Practising emergency upgrading to routines is indeed essential but the use of general anaesthesia can be entirely avoided for this purpose. In my opinion general anaesthesia is as be nd at sea for surgical emergencies during peace time in the following c rcumstances.

1 The ship's post on is too distant from a shore hospital and the pat ent's condition too unstable to await transfer when close enough

2 The shore hospital facilit es are inadequate

3 Exceptionally the ship's operat onal role s of such overr ding import ance that d version is unaccep table

From my own experience I appreciate that there is much pressure on a surg cal team to justify their skills at sea. However one should never be tempted to content the executive at the expense of one's patient. A surgical team in peace time is an insurance policy with a day to day role, that is little diff rent from any other medical officer on any other ship or establishment. Routine elective surgery that cannot be performed under simple local anaesthesia should be carried out in the relative security of a modern hospital ashore

Yours sincerely
S Q M TIGHE FFARCS
Surgeon Lieutenant Commander RN
Consultant in Anaesthetics

Achievements by Junior Officers

Surgeon Lieutenant G A Hill has passed both Part A of the Fellowship examination of the Royal College of Surgeons of Edinburgh and Primary FRCS (London)

Surgeon Lieutenant M A Howell has passed Primary FRCS (London)

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Obituary



A memorial service for **Surgeon Vice Admiral Sir Robert Panckridge KBE CB** who died 30 June 1990 was held in St Luke's Chapel, Royal Naval Hospital Haslar on Wednesday 10 October 1990 when the following address was given by **Surgeon Vice Admiral Sir Dick Caldwell KBE CB**

I am pleased to have been asked to say a few words about Admiral Panckridge at this memorial service. I do not see it as a sad occasion and I feel sure that his relatives will agree with me. His daughter and son in law are here with their family and to them of course we extend our sympathy and condolences, but Bob has had a long, a happy and a very successful life and died peacefully at the splendid age of 88 in no great pain or distressing illness.

He was the son of a doctor in Petersfield; he did his medical training at the Middlesex Hospital and [illegible] the R[illegible] 1927 and after a spell at sea and [illegible] West Indies Station in HMS [illegible] to Surgeon Lieutenant C[illegible] for the post of instructor and [illegible] Surgeon Lieutenant [illegible] RN Hospital Haslar for the three [illegible] of the N[illegible]

It was [illegible] quark of [illegible] I noticed this church was shep[illegible] conscious [illegible] staff [illegible] Williams [illegible] and white gloves—no less [illegible] today [illegible] those times in which Bob played such a prominent part.

In those days he had already developed [illegible] affection for the Navy and all its tradition and its customs and etiquette. He was [illegible] to us—the young doctors—he became our [illegible] our mentor and quickly our friend guiding us through the tricky waters of correct dress, rank, procedure. All this on top of hospital ward work, laboratory work and lectures on tropical diseases, skins, VD and so forth—they were great days and I know that Bob, like many of us, always had a great affection for Haslar. He and his wife [illegible] who sadly died in 1983 were both [illegible] and there can be few people [illegible] know them [illegible] served with Bob who had not enjoyed [illegible] and the[illegible] lively companionship.

Don't imagine that I have made Bob sound [illegible] kind, good and helpful to be true. [illegible] tough disciplinarian when it was required. I [illegible] remember one occasion when I was standing talking to Bob in Officers' Medical [illegible] walking up the corridor a young [illegible] coat with a lighted cigarette in his mouth [illegible] said Bob, that young man needs [illegible] (favourite expression of his) and off he rushed like a greyhound after a rabbit.

During the war, while Malta was undergoing a constant bombing attack, its siege and its shortages, Bob was serving as the X-ray Specialist in Bighi Hospital and then in a similar post in Plymouth and subsequently he was appointed PMO Royal Naval College Dartmouth. He always regarded this as his most enjoyable and favourite job. In those days

emphasis was on the 13 year old cadets and the Sick Bay in the College grounds was more like a little cottage hospital with a naval pensioner staff and two naval nursing sisters. It was adjacent to the PMO's house which was bountiful Georgian with a large garden packed with flower beds and daffodils and overlooking the river Dart. Is it any wonder Bob and Jackie and Sally were so happy there? Their spaniel Prince rounded off the quartet.

He served there for three years and was then promoted to Surgeon Captain posted out to Hong Kong in charge of the Hospital there—and fate seemed to step in again for me when I was sent to relieve him at Dartmouth. Jackie invited my wife and me to come and stay with them while Bob and I did the turnover. This proved to be a useful hospitable and enjoyable exercise. Having completed his three years in the still comparatively new Naval Hospital at the top of the Peak in Hong Kong, he then returned to Haslar and subsequently to RN Hospital Chatham where he saw it close down as a Naval base.

At Chatham he had now achieved Flag rank and as Surgeon Rear Admiral in 1958 he was now MOH of RN Hospital and also Command Medical Officer to the Commander in Chief Nore.

However 1960 was his most memorable year as he was awarded the CB and was also selected for the post of Medical Director General of the Navy. I was in Sicily the day the news broke and heard the news from Malta that evening. Later that same evening Vesuvius erupted in most spectacular pyrotechnics. I remembered to tell Bob of this further singular distinction—he enjoyed that.

Post war and in the nineteen fifties onwards there has been a dramatic growth in the clinical and professional standing of the Naval Medical Service—this in no way decries the splendid contribution that Naval doctors (RN and RNVR) provided during the war but our reputation has steadily improved and now we even aim at keeping up with the quite astonishing speed of advancing clinical diagnosis and expertise in the medical world outside. In all this Surgeon Vice Admiral Sir Robert Funckridge has, of course contributed. I understand that in Oughtibridge where he retired he was widely and affectionately known as Admiral Sir Bob. Let us then remember him with affection—and salute him. He was a good man, a generous man, a happy man and gave an immense amount to the Navy.

We have recently learnt of the deaths of **Surgeon Commander R S Forrester RN** on 23 April 1990 of **Surgeon Captain D H Kernohan CBE RN** on 18 September 1990 of **Surgeon Captain W D Taylor RN** on 27 October 1990 and of **Surgeon Commander W W Simkins RN** in November 1990. Any personal reminiscences will be welcomed by the Editor.

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SERVICE NEWS

Air Marshal N H Mills QHP MB BS FFOM DAvMed RAF Surgeon General and D[illegible] M[illegible] Services (RAF)



Air Marshal [illegible] MB [illegible] Hospital [illegible] RAF [illegible] Hospital [illegible] Singapore [illegible] RAF Halton [illegible]

After attending the RAF Staff College [illegible] M[illegible] Wing of RAF Hospital Wegberg [illegible] RAF [illegible] and Commanding Officer of MRU [illegible]

DPMO at HQ STC and PMO RAF [illegible] preceded attendance at RCDS in [illegible] December 1987 saw promotion to AVM and Director General [illegible] Medical Services (RAF).

A Commander (Brother) of the Order of St John and Fellow of the Royal Society of Medicine, Air Marshal Mills was appointed Queen's Honorary Physician in April 1988.

ROYAL NAVAL MEDICAL AND DENTAL OFFICERS

APPOINTMENTS AND PROMOTIONS

As Medical Director General (Naval)
1 October 1990
Surgeon Rear Admiral D A Lammiman LVO QHS

To Surgeon Rear Admiral and appointed SRA(SMS)
17 September 1990
Surgeon Captain F StC Golden OBE QHP

As Medical Officer in Command, Royal Naval Hospital Haslar
4 September 1990
Surgeon Captain I L Jenkins

As Medical Officer in Charge Institute of Naval Medicine
7 August 1990
Surgeon Captain J W Davies

As Consultant Adviser in Anaesthetics to Medical Director General (Naval)
6 August 1990
Surgeon Captain M J Mann

As Consultant Adviser in Accident and Emergency Medicine to Medical Director General (Naval)
8 June 1990
Surgeon Commander I C Grant

As Consultant Adviser in Orthopaedic Surgery to Medical Director General (Naval)
4 June 1990
Surgeon Commander M A Farquharson Roberts

As Consultant Adviser in Ophthalmology to Medical Director General (Naval)
Acting Surgeon Commander M N Jeffries

To Surgeon Lieutenant Commander
N Q Allison S P G Bird P J Bustin
D P Cowie D F Cumberlidge C J A Edwards
P M Kemp P H Loxdale R M C McNeill Lovi
A W Morrison M M Parrish J N Petty

To Surgeon Lieutenant Commander (D)
N B Baker D W Mottar

To Surgeon Lieutenant
R L R Dunn S J Easterbrooke M C Evershed
S J Hammond D H Jarvis P A Mançais
S A Shipley P J Wolstenholm

To Surgeon Lieutenant (D)
C R D Fox

To Acting Surgeon Lieutenant
P Billingsley P E Howden G A H Johnson
S J Leigh Smith F W King Lewis E Mather
A J Mellor R Miles S W S Millar
E A Nichols S J Thrust M C O Tint
S M Tellam M S Turner S A L White

Provisional Selections for Promotion to date 31 December 1990

To Surgeon Captain
R T Connier J O Soul

To Surgeon Commander
S Q M Tighe S J Squires P I Ruffinelli
D N Tulloch

To Surgeon Commander (D)
R M Stevenson

Surgeon Captain D J Mckay has been appointed The Commander St John Ambulance Brigade Isle of Wight County

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HIGHER QUALIFICATIONS

Surgeon Lieutenant Commander D V Lunn—FCA
Surgeon Lieutenant Commander
A W Scott Brown—MRCGP
Surgeon Lieutenant Commander
I G Snekling—MRCGP
Surgeon Lieutenant Commander
N F J Scott Moncrieff—MRCGP
Surgeon Lieutenant Commander
R W J Haddon—MRCGP
Surgeon Lieutenant M S Smith—MMedSc and AFOM
Surgeon Lieutenant Commander
R G Jones—DRCOG
Surgeon Lieutenant Commander
A R Roberts—DRCOG
Surgeon Lieutenant Commander (D)
C R Pritchard—MSc (Periodontology)
Surgeon Lieutenant J A Burden—DCH

AWARDS

The Gilbert Blane Medal for 1989 has been awarded to **Surgeon Commander C J Davis** for his work on neuropharmacological investigations into mechanisms of emesis caused by cytotoxic drugs and radiation

Surgeon Lieutenant Commander S L Hutchinson was a prize winner in the Royal College of Surgeons Advanced Trauma and Life Support Provider Course 2–4 May 1990

CONSULTANTS, SENIOR SPECIALISTS AND SPECIALISTS

The following professional advancements are announced

Consultant

Ophthalmology

Surgeon Commander M N Jeffries—June 1990

Applied Physiology

Surgeon Commander T J K Francis—April 1990

Psychiatry

Surgeon Commander D K Price—March 1990

General Surgery

Surgeon Commander C F G Barker—May 1990

Orthopaedics

Surgeon Commander S D Glover—March 1990

Senior Specialist

General Surgery

Surgeon Lieutenant Commander J K Campbell

Oral Surgery/Oral Medicine

Surgeon Lieutenant Commander (D) S J Liggins

Specialist

Anaesthetics

Surgeon Lieutenant Commander R C Scott

General Surgery

Surgeon Lieutenant Commander S L Hodkinson

NEW ENTRIES

Surgeon Lieutenant Commander (Miss) S Hagne
Surgeon Lieutenant Commander (D) (Mrs) J B Sutton
Surgeon Lieutenants M H Lygo, S R C Smith
Surgeon Lieutenants (D) M F Thomas, D J Mellarrow, N Wilkie
Surgeon Sub-Lieutenants J J Dekker, R M Haemes (Miss) L Lawson, (Miss) S C Vosper

RE-ENTRIES

Surgeon Lieutenant Commanders C J V Fenton, R W J Haddon

TRANSFERS TO FULL CAREER COMMISSION

Surgeon Commander C K Kershaw
Surgeon Lieutenant Commanders P J Fenton, H J Cox, S A Johnson, P H Lisdale, A J D Neal, N F J Scott-Moncrieff

PLACED ON EMERGENCY LIST

Surgeon Lieutenant Commanders S P G Bird, R F Bryce, I C Suckling
Surgeon Lieutenant Commanders (D) M W Bray, N S Hall
Surgeon Lieutenants C B Barry, P R F Davies, P S Ellis, J M Price
Surgeon Lieutenants (D) A K Davies, T J Rutledge

RETIREMENTS

Surgeon Vice Admiral Sir Godfrey Milburn Thompson KBE



Sir Godfrey Milburn Thompson entered the Royal Navy [illegible] specialised in ophthalmology and gastroenterology. He served in the Royal Navy Medical Service for his most [illegible] antagonist [illegible] resulted in [illegible] ing him [illegible] was [illegible] RNSM. [illegible] First [illegible] set[illegible] ing up [illegible] medical [illegible] 1970s. [illegible] turn [illegible] outside the Service.

Of [illegible] period as Medical Director-General (RN) spanned the six years from 1984 to 1990. This was a longer term of office than that of his predecessors this century and took place during a period of considerable change both for the Armed Forces as a whole and the Medical Services in particular.

He took up his appointment just before the implementation of the reorganisation of the Defence Medical Services Directorate following the investigation of Sir Henry Yellowlees. On paper there were

undoubted attractions of the revised structure which saw a split along functional lines between the various elements of the Headquarters with its service staff manning each section. Under this, fell to Sir Godfrey whilst holding the appointment of Deputy Surgeon General (Research and Training) and subsequently Surgeon General to oversee the running of what proved to be a less than totally practical innovation.

There were a number of areas in which the service arrangements proved their worth but in particular in operational policy and planning which led directly, considerably to the strategy in 1985 when the Chiefs of Staff were able to give full support to the plans for medical support in war. However it was not all plain sailing and attempts to achieve adjustment were bitterly fought during the staffing process.

In spite of these considerable burdens he never lost sight of the human dimension and was described by many as a master of MOD infighting. In this he was aided by both his prodigious memory and his length. Indeed, this frequently enabled him to remind his colleagues and subordinates of the arguments that had been advanced against the latest of bare bones schemes which had been run previously.

Excursions in Europe during the latter part of his period as SG and MDG(N) added fuel to the challenges as new medical staffs tried pre-emptively to stake their medical support independence of the public purse. Equally his size and shape, of the Hunt Inspection, left Sir Godfrey's response was typical. Whilst enjoying through love of logic that unanimity did not with MOD staffs he fuelled his MDG's enthusiasm that could be done to house a new Defence Medical Rehabilitation Unit, being held that there should be greater maximum differential between the three Medical Services than to allow up shortfalls to be unrelated.

Equally more importantly he left most strongly the unified duties of between doctors, dentists and animals old he broke down and the content and with Christian unified. In this he was not parochial—I as will we—there will remember the words of his farewell Dinner speech.

> I look forward to the day when a Dental Officer will be MDG(N)—and I think she will do the job very well.

It and then this change in attitude is hardly recognised—it probably be the legacy of which he would be most proud and for which he will be the greatest credit to thank him.

Inevitably Sir Godfrey's retirement will not be a period of relaxation. Apart from running the UK support for the St John Ophthopaedic Hospital in Jerusalem he will also be taking on a further challenge as the Chairman of the Chartered Community Health Care Trust. In both these endeavours we wish him and Lady Noreen the best of fortune in the knowledge that without his guiding hand in the latter the RNMS would undoubtedly have fared far worse over the last six years.

Surgeon Rear Admiral (D) D A Coppock
MSc BDS QHDS OStJ CB



Surgeon Rear Admiral (D) Coppock taking the Inspection at CTCRM Lympstone

Surgeon Rear Admiral (D) David Coppock retired in May 1990 having served as Director of Naval Dental Services for almost five years half of which time was also spent working the hat of Director of Defence Dental Services.

David Coppock served as a Royal Naval dental officer for approximately 35 years. He was born in Wiltshire and was educated at Bishop Wordsworth School, Salisbury, before studying Dentistry at Guy's Hospital. Here he was a gifted student but he will no doubt be remembered by his contemporaries for his inherent sense of humour as well as being the manager of the Guy's water polo team.

Almost immediately after qualification in 1955 he entered the Royal Navy and soon found himself at Shotley in Suffolk practising dentistry on the New Entry boy seamen of HMS *Ganges*. His enthusiasm for amateur dramatics was already starting to show during these early days of his Naval career. In 1955 he was appointed to the aircraft carrier HMS *Eagle* in time to see action in the Suez Campaign following which he transferred to the Mediterranean Fleet in 1957.

The end of the Fifties brought his first overseas shore appointment in Hong Kong. Here his professional skills were also applied outside the Service in

supporting the St John Ambulance [illegible] the so-called penetration squads [illegible] dentists and nurses gave up their [illegible] weekends to treat villagers in the re[illegible] colony

On return to UK there followed [illegible] in HMS *Hermes* and various Portsm[illegible] lishments before his promotion [illegible] Gibraltar to Surgeon Commander [illegible] his the sporting front David had become a [illegible] standard tennis player and a passable golfer

In 1972 he became the first post-[illegible] dental officer to serve with the United States Navy Dental Corps. He studied in the Naval Graduate Dental School, Bethesda for his Master's Degree in Oral Histology which was awarded in 1974.

He shattered for all time any preconceived ideas his USN colleagues may have had about typical British reserve! His reputation as an after dinner speaker was much that he travelled the States widely at the invitation of a large and varied number of American institutions.

Back in England once more he briefly served at the Naval Dental Clinic, London and the Royal Naval College, Greenwich before his appointment as Officer in Charge of the RN Dental Training School.

On promotion to Surgeon Captain (D) in 1978 he commenced a series of senior administrative posts in the Branch—Director of Dental Training and Research, Deputy Director Naval Dental Services and Command Dental Surgeon to Commander in Chief Naval Home Command, which were to prepare him for his future role as Director.

During his years in the Service David Coppock was strongly supported by his first wife, Mirin, who tragically died in late 1985. Their two daughters, Pamela and Nicola, became a doctor and a dentist respectively. Nicola also served a Short Career Commission with the RADC, being often referred to by her father at that time as 'the other Captain Coppock'. Both ladies are now married.

As David relinquished his onerous task, he did so on a particularly happy note with the announcement of his marriage to Mrs Sally Arnold, made at a memorable dining out at HMS *Collingwood* on 4 May 1990.

Admiral Coppock leaves the Service to devote both his leisure and working time to his other great passion—fly fishing!

[illegible] Service and [illegible] Association for the [illegible] Fund [illegible] years in the Service David Coppock [illegible] David [illegible] wish [illegible] town [illegible] the [illegible] dation [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

MEDICAL SERVICES

AWARDS

The Sick Berth Petty Officer's Efficiency Medal for 1989 has been awarded to Petty Officer Medical Assistant A M Forbes

WO(MA) F L Bucks and WO(MA) M B Page MBE have been selected for the award of the Meritorious Service Medal for 1990

Lieutenant Commander K Baker MSc, SRN, Cert Ed Royal Navy award by the Committee on Awards to Inventors



[illegible] Medical Officer [illegible] Royal Naval Medical [illegible] Petty Officer Medical Assistant [illegible] Mk 8 Submarine [illegible] SMN fitted by [illegible] Submarine [illegible] and the Medical Assistant [illegible] Submarine [illegible] and Rescue Submarine [illegible] time it is distressed [illegible] should be able to survive [illegible] escape

[illegible] Commander Ken Baker [illegible] Medical Assistant [illegible] specially designed and tested modification to the MEBS and achieved significant performance improvements which are estimated to increase chances of survival by over 40%. In recognition of Lieutenant Commander Baker's work and its value to the Royal Navy the Committee on Awards to Inventors has made him an award of £8 000.

Lieutenant Commander Baker is currently the Executive Officer and Principal Training Officer in the Royal Naval Medical Staff School

PROMOTIONS

To Lieutenant
R P Kenny S R Holder

To Warrant Officer (MA)
L L McNulty

CONFIRMED IN RANK

Sub Lieutenants D A Griffiths
S T O Callaghan

NEW ENTRIES

Acting Sub Lieutenants I M Dell
B R Richards T J Ryder A J Skinner

RETIREMENTS

Lieutenant L W Smith

QUEEN ALEXANDRA'S ROYAL NAVAL NURSING SERVICE

APPOINTMENTS AND PROMOTIONS

To Principal Nursing Officer
C M Taylor

To Chief Nursing Officer and as Matron, Royal Naval Hospital Gibraltar
F M Hinchliffe

To Superintending Nursing Officer
G S Forty

To Senior Nursing Officer
M Dean J M Leanon S A E Ruyle
C L Smith

NEW ENTRIES

Senior Nursing Officer T C Ennis
Nursing Officers M M Esaw J E W Kelly
E A Linden

WITHDRAWN ON COMPLETION OF SHORT CAREER COMMISSION

Senior Nursing Officers C L Pearson
J S R Houghton H Morris J E Thomas

RETIREMENTS

Principal Nursing Officer M E Williams RRC BA
Superintending Nursing Officer E N Chandler

AWARDS

Superintending Nursing Officer H R M Schofield ARRC and **Senior Nursing Officer I Hooks** have been awarded the degree of **Master of Arts in Education**

Senior Nursing Officer G E Watkinson has been awarded the **Health Education Certificate**

ROYAL NAVAL RESERVE

PROMOTIONS

To Surgeon Lieutenant Commander
R D Ashpole (*Thames, Ex*)
K J Pust (*Edward*)
J F Sweenie (*Caledonia*)

To Acting Surgeon Lieutenant
S J Wilson (*Thames, Ext*)

Provision Selections for Promotion to date 30 September 1990

To Surgeon Commander
N R J Hooper (*Flying Fox*)
K B Queen (*Cambria*)

NEW ENTRIES

Surgeon Lieutenant Commander J M Inwood (*Chiltern House*)
Probationary Surgeon Lieutenant I R Mackiman (*Scimitar*)

Surgeon Lieutenant Commander I M Wilson (*Thames*) were entered in the Royal Naval Reserve as Surgeon Lieutenant Commander not Surgeon Lieutenant as listed in the Summer 1990 issue of the Journal

CONFIRMED IN RANK

Surgeon Lieutenant D C Martin (*Drake*)
Surgeon Sub Lieutenant S J Wilson (*Thames, Ext*)

PLACED ON RETIRED LIST

Surgeon Lieutenant Commander D W S [illegible] (*Glan Hafren*)
Surgeon Lieutenant Commander A J Vallence Owen (*Cambria*)
Surgeon Lieutenant Commander A Edwards (*Flying Fox*)



Senior Nursing Officer I Hooks and Superintending Nursing Officer H R M Sutcliffe ARRC having received their Master of Arts in Education Degrees at Southampton University on 4 July 1990

MEDICAL OFFICER IN COMMAND



The superintendent Medical Officer in Command Royal Naval Hospital Haslar taking the salute on 4 September 1990 Surgeon Captain P SIC Golden OBE RHP and Surgeon Captain I L Lyons



On 28 September 1990 Warrant Officer Bonnie Page MBE was presented with the Meritorious Service Medal by Rear Admiral Michael Layard CBE Flag Officer Naval Aviation at HMS Yeovilton Her husband Warrant Officer Peggy is Medical Administration Officer on the Admiral's Fleet Air Arm Staff The photograph shows (from left to right) Lieutenant Commander I Mason Flag Lieutenant Rear Admiral Layard Warrant Officer Page Mrs Elizabeth Page and Surgeon Captain D C White Command Medical Officer

The new Medical and Dental Centre at HMS Heron being opened by the Surgeon Vice Admiral Sir Ian Milton Thompson KBE on 12 July 1990



In December 1979 MoD approval was given for a purpose-built complex to replace the partially built indeterminable age with portacabin extension added in 1987. Building commenced in May 1989 and was completed in June 1990.

The practice list is currently 2249 patients. Full primary care services are offered to RN, RM, RAF and NATO personnel and registered dependants living within a two-mile radius of the establishment. Emergency dental care and first aid for all civilian employees is also provided.



The photograph above shows Surgeon Rear Admiral Sir Godfrey and Chief Officer (CPO) (QARNNS) Commanding Officer of HMS Heron

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WHO FIGHTS FOR THE SOLDIER WHEN THE SOLDIER CAN'T FIGHT?



SSAFA

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by a recent young
double amputee



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COMBAT *STRESS*

When his ship was torpedoed, so was his future peace of mind



Leading Seaman [illegible] served on through the wild winter of 1940/41 in the Atlantic and suffered from appalling conditions and the horrific sights he saw. Then came the day when he was torpedoed.

In 1945 his navy days were over. He spent the next 25 years in and out of mental hospitals. He now lives with a [illegible] Solihull and further [illegible] breakdown in forcing [illegible] country. Every day, the [illegible] are a [illegible] life.

[illegible] Combat Stress [illegible] homes and Veterans Hom[illegible] [illegible] specialist [illegible] themselves. We also assist ex-[illegible] [illegible] enduring this they deserve.

[illegible] men and women, and our [illegible] Forces them we must have [illegible]. Please send [illegible] remember us with a legacy. The [illegible] is owed by all of us.

"They've given more than they could - please give as much as you can"

[illegible] [illegible] [illegible]

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